WRC-2000 WORLD RADIOCOMMUNICATION CONFERENCE

ISTANBUL, 8 MAY – 2 JUNE 2000

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PLENARY MEETING

CITEL Administrations

PROPOSALS FOR THE WORK OF THE CONFERENCE

TABLE OF SUPPORT TO THE INTER-AMERICAN PROPOSALS (IAP) 74-236

IAP #	Topic	Agenda item	ATG	ARG	BAH	BRB	BLZ	BOL	B	CAN	CHL	CLM	CTR	DMA	EQA	SLV	GRD	GTM	GUY	HTI	HND	JMC	MEX	NCG	PNR	PRG	PRU	DOM	SCN	LCA	VCT	SUR	TRD	USA	URG	VEN
74	Addition of country names of Region 2 in the footnotes to Table S5.293 and S5.480 of the ITU Radio Regulations	1.1		x						x						x		x					x				x							x	x	x
75-84	Modification of Recommendation 66 (Rev.WRC-97)	1.2		x				x		x		x			x	x		x																x	x	
85	A proposal for the suppression of Resolution 60	1.3		x				x		x		x	x		x	x		x																x	x	
86-106	Proposal for the addition of the Fixed-Satellite Service in the 40.5-42.5 GHz band in Region 1, Mobile-Satellite Service in the 40.5-41 GHz band and the Broadcast-Satellite Service in the 40-40.5 GHz band, and the use of the frequency range 37 – 43.5 GHz by terrestrial and satellite services	1.4		x				x		x		x	x			x 1							x				x							x	x	
107	Proposal to modify Res 122, High Altitude Platform Stations in the fixed service	1.5		x				x				x	x										x			x	x							x	x	
108-110	Proposal to Identify Additional Spectrum for IMT-2000	1.6.1		x						x	x	x	x			x		x					x				x								x	x
111	Proposal for NOC in the 2 700 – 2 900 Band	1.6.1		x				x			x	x	x		x	x		x					x			x								x	x	x
112-117	Proposal to modify Footnotes S5.353A and S5.357A	1.10		x				x		x		x			x			x					x			x								x	x	
118-123	Resolution 131 (WRC-97): Power Flux-Density limits applicable to non-GSO FSS systems for protection of terrestrial services in the bands 10.7 – 12.75 GHz and 17.7 – 19.3 GHz;	1.13.1		x					x	x		x			x								x											x	x	
124	Inclusion in other frequency bands of similar limits in Articles S21 and S22, or other regulatory approaches to be applied in relation to sharing situations	1.13.2		x					x	x		x			x								x											x	x	
125-126	Proposal for RNSS allocation (space-to-Earth) in the upper part of the band 960-1215 MHz	1.15.1		x				x		x	x	x	x										x											x	x	

[1] Indicated support to MOD resolution 726, only.

IAP #	Topic	Agenda item	ATG	ARG	BAH	BRB	BLZ	BOL	B	CAN	CHL	CLM	CTR	DMA	EQA	SLV	GRD	GTM	GUY	HTI	HND	JMC	MEX	NCG	PNR	PRG	PRU	DOM	SCN	LCA	VCT	SUR	TRD	USA	URG	VEN
127-128	Proposal for RNSS allocation (space-to-Earth) in the upper part of the band 1260-1300 MHz	1.15.1						x		x	x	x	x										x											x	
129-131	Proposal for RNSS (Earth-to-space) 5000 to 5010 MHz and (space-to-Earth) 5010-5030 MHz	1.15.1		x				x		x	x	x	x										x											x	
132-133	Proposal for RNSS (Earth-to-space) in the band 1300–1350 MHz	1.15.1		x				x		x	x	x	x										x											x	
134-135	Radionavigation-satellite service allocations in the bands 1 215 -1 260 and 1 559 - 1610 MHz	1.15.2		x						x		x	x		x	x							x										x	x	x
136-228	Proposal to modify the allocations above 71 GHz	1.16		x				x	x	x	x	x	x		x	x		x					x			x							x	x	
229	Ensuring the protection of other radiocommunication services and Region 2 BSS against interference from any revisions to the Regions 1 and 3 Plan, and not requiring these services to provide greater protection to Regions 1 and 3 BSS than at present	1.19		x						x													x										x	x	
230	Radio Regulations Board's Rules of Procedure relating to the application of RR 2674/S23.13	1.19 bis		x				x	x	x			x					x					x										x	x	x
231	PFD limits in Annex 1 to Appendix S30 (Sections 5b and 5c)	1.20		x					x	x						x							x										x	x	
232-233	Proposals to modify Resolution 27 (Rev.WRC-97) and Resolution 28 (WRC-95)	2		x				x	x	x		x			x																		x	x	
234	A proposal for the suppression of Resolution 63	4		x				x		x					x	x																		x	x	
235-236	Footnote S5.488											x			x	x		x									x								x	x

WRC-200 Agenda Item 1.1

Proposals of Administrations aimed at deleting country footnotes, or country names in footnotes, if no longer required, within the limits of Resolution **26 (Rev. WCR-97)**.

Addition of country names of Region 2 in the footnotes to Table S5.293 and S5.480 of the ITU Radio Regulations

Submitted by the Administrations below:

[Antigua and Barbuda], [Bahamas], [Barbados], [Belize], [Bolivia], [Brazil], [Chile], [Colombia], [Costa Rica], [Dominica], [Ecuador], [United States], [Grenada], [Guyana], [Haiti], [Honduras], [Jamaica], [Nicaragua], [Panama], [Paraguay], [Dominican Republic], [Saint Lucia], [Saint Vincent and the Grenadines], [Saint Kitts and Nevis], [Suriname], [Trinidad and Tobago],

Argentina, Canada, El Salvador, Guatemala, Mexico, Peru, United States, Uruguay, Venezuela

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Background Information:

Footnote S5.293

In the Table of Frequency Allocation of the Radio Regulations, the frequency ranges 470-512 MHz and 614-806 MHz have been allocated in Region 2, on a primary basis, to BROADCASTING and, on a secondary basis, to the Fixed and Mobile Services.

The footnote S5.293 indicates that Chile, Colombia, Cuba, United States, Guyana, Honduras, Jamaica, Mexico and Panama allocated with a different category of service, on a primary basis, in the bands 470-512 MHz and 614-806 MHz to the Fixed and Mobile Services, replacing the secondary category of service, and subject to agreement under S9.21.

In relation to the use of the band, the Table incorporates footnote S5.292: Different category of service, indicates that Mexico and Venezuela allocate the band 470-512MHz to the fixed and mobile services, and Argentina and Uruguay to the mobile service, on a primary basis, subject to agreement under No. S9.21.

Footnote S5.309: Different category of service, indicates that Costa Rica, El Salvador and Honduras allocate the band 614-806 MHz to the fixed service on a primary basis, subject to agreement under No. S9.21.

The footnote S5.311 indicates that in the frequency band 620-790 MHz assignments may be made to the television stations with frequency modulation in the Broadcasting Satellite Service, with prior agreement among the concerned administrations and with those administrations whose services, operating in accordance with the Allocation Table, may be affected (see Res. 33 (Rev. WRC-97) and 507). These stations will not be able to produce a power flux density above –129dB (W/m^2) for angles of arrival below 20° (see Recommendation 705) in other countries' territory.

Footnote S5.480

In the Table of frequency allocations, the frequency range 10-10.45 GHz has been allocated in Region 2, on a primary basis, to RADIOLOCATION and, on a secondary basis, to the Amateur service.

The footnote indicates that Brazil, Costa Rica, Ecuador, Guatemala, Honduras and Mexico have allocated, on a primary basis, the band 10-10.45 GHz to the Fixed and Mobile Services.

Proposal(s):

IAP/14/74
MOD

To request from ITU WRC-2000 to open the footnotes of Table S5.293 and S5.480 to enable countries of Region 2 to add their names to such footnotes.

Reason:

In the preparation for WRC-2000 by the Inter-American Telecommunication Commission (CITEL), countries of Region 2 expressed the need to add their country names to these footnotes, in order to provide their services with the level of protection accorded other services allocated on a primary basis.

In order to satisfy this need, it is requested that WRC-2000 approve the consideration of these footnotes, using the same criteria as was adopted by WRC-97 on this issue, which allowed the addition of country names to the footnotes.

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to finalize remaining issues in the review of Appendix **S3** to the Radio Regulations with respect to spurious emissions for space services, taking into account Recommendation **66 (Rev.WRC-97)** and the decisions of WRC-97 on adoption of new values, due to take effect at a future time, of spurious emissions for space services;

Modification of Recommendation 66 (Rev.WRC-97)

Submitted by the Administrations below:

[Antigua and Barbuda], [Bahamas], [Barbados], [Belize], [Brazil], [Chile], [Costa Rica], [Dominica], [United States], [Grenada], [Guyana], [Haiti], [Honduras], [Jamaica], [Mexico], [Nicaragua], [Panama], [Paraguay], [Peru], [Dominican Republic], [Saint Lucia], [Saint Vincent and the Grenadines], [Saint Kitts and Nevis], [Suriname], [Trinidad and Tobago], [Venezuela]

Argentina, Bolivia, Canada, Colombia, Ecuador, El Salvador, Guatemala, United States, Uruguay

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Background Information: Recommendation **66** is being modified to reflect the current status of this document. Work has been completed on space service spurious emissions, so we are proposing the suppression of *Considering f, recommends 1 and 2* -. We are editing "*Recognizing I"* to conform to the concept in the *recommends* that limits may be needed for specific situations. We are proposing the suppression of *Recommends 9* because TG1/5 has concluded that OOB emission limits are not appropriate at this time.

Proposal(s):

IAP/14/75

MOD

RECOMMENDATION 66 (Rev.WRC-~~97~~2000)

Studies of the maximum permitted levels of unwanted emissions

The World Radiocommunication Conference (~~Geneva, 1997~~ Istanbul, 2000),

considering

a) that Appendix **S3** specifies the maximum permitted levels of spurious emissions, in terms of the mean power level of any spurious component supplied by a transmitter to the antenna transmission line;

b) that the principal objective of Appendix **S3** is to specify the maximum permitted levels of spurious emissions that, while being achievable, provide protection against harmful interference;

c) that excessive levels of unwanted emissions may give rise to harmful interference;

d) that while out-of-band emissions can also give rise to harmful interference, the Radio Regulations do not provide general limits for these emissions;

e) that while Appendix **S3** applies generally to the mean power of a transmitter and its spurious emissions, it also takes account of a variety of emissions where interpretation of the term "mean power", and thus its measurement, would be difficult, particularly in the cases of digital modulation broadband systems, pulsed modulation and narrow-band high-power transmitters;

IAP/14/76
SUP

~~*f)* that while Appendix **S3** covers spurious emissions for all radio services, those listed for space services are included only as design objectives;~~

Reason: Work has been completed on space service spurious emissions.

IAP/14/77
MOD

~~*g)*~~*f)* that unwanted emissions from transmitters operating in space stations may cause harmful interference, particularly emissions from wideband amplifiers which cannot be adjusted after launch;

~~*h)*~~*g)* that unwanted emissions may cause harmful interference to safety services and radio astronomy and space services using passive sensors;

Reason: Consequential numbering changes

IAP/14/78
MOD

~~*i)*~~*h)* that, for technical or operational reasons, more stringent spurious emission limits than the general limits in Appendix **S3** may be required to protect specific services, such as safety services and passive services in specific bands or situations;

Reason: Edited to conform to the concept in the recommends that limits may be needed for specific situations.

IAP/14/79
MOD

~~*j)*~~*i)* that broadband digital modulation may cause unwanted emissions at frequencies far from the carrier frequency,

Reason: Consequential number change

noting

a) that safety services and passive services have in many cases been allocated frequencies adjacent or close to those of services employing high-power transmitters;

b) that some administrations have adopted more stringent limits for spurious emissions than those specified in Appendix **S3**,

recommends that ITU-R

IAP/14/80
SUP

~~1 study, as a matter of urgency, the question of spurious emissions resulting from space service transmissions, and, on the basis of those studies, develop Recommendations for maximum permitted levels of spurious emissions in terms of mean power of spurious components supplied by the transmitter to the antenna transmission line;~~

Reason: Work has been completed on space service spurious emissions.

IAP/14/81

SUP

~~2 submit a report to WRC-99 on the results of its studies with a view to reviewing and including spurious emission limits for space services in Appendix **S3**;~~

Reason: Work has been completed on space service spurious emissions.

IAP/14/82

MOD

~~3~~1 continue the study of spurious emission levels in all frequency bands, emphasizing the study of those frequency bands, services and modulation techniques not presently covered by Appendix **S3**;

~~4~~2 study the question of unwanted emissions resulting from transmitters of all services and all modulation methods, and, on the basis of those studies, develop a Recommendation or Recommendations for maximum permitted levels of spurious emissions and out-of-band emissions;

~~5~~3 establish appropriate measurement techniques for unwanted emissions, where those techniques do not currently exist, including the determination of reference levels for wideband transmissions as well as the applicability of reference measurement bandwidths;

~~6~~4 study the reasonable boundary of spurious emissions and out-of-band emissions with a view to defining such a boundary in Article **S1**;

~~7~~5 study those frequency bands and instances where, for technical or operational reasons, more stringent spurious emission limits than the general limits in Appendix **S3** may be required to protect safety services and passive services such as radio astronomy, and the impact on all concerned services of implementing or not implementing such limits;

~~8~~6 study those frequency bands and instances where, for technical or operational reasons, out-of-band limits may be required to protect safety services and passive services such as radio astronomy, and the impact on all concerned services of implementing or not implementing such limits;

Reason: Consequential numbering changes

IAP/14/83

SUP

~~9 report to a future competent world radiocommunication conference the results of studies under *recommends that ITU-R* 3, 4 and 5 above, with a view to recommending whether or not it is appropriate to include general limits for out-of-band emissions in the Radio Regulations;~~

Reason: Suppressed because TG1/5 has concluded that OOB emission limits are not appropriate at this time.

IAP/14/84

MOD

~~10~~7 report the results of studies under *recommends that ITU-R* ~~6, 7 and 8~~ 4, 5 and 6 above to a competent world radiocommunication conference(s).

Reason: Consequential numbering change

WRC-2000 Agenda Item 1.3

to consider the results of ITU-R studies in respect of Appendix **S7/28** on the method for the determination of the coordination area around an earth station in frequency bands shared among space services and terrestrial radiocommunication services, and to take the appropriate decision to revise this Appendix

A proposal for the suppression of Resolution 60

Submitted by the Administrations below:

[Antigua and Barbuda], [Bahamas], [Barbados], [Belize], [Brazil], [Chile], [Dominica], [United States], [Grenada], [Guyana], [Haiti], [Honduras], [Jamaica], [Mexico], [Nicaragua], [Panama], [Paraguay], [Peru], [Dominican Republic], [Saint Lucia], [Saint Vincent and the Grenadines], [Saint Kitts and Nevis], [Suriname], [Trinidad and Tobago], [Venezuela]

Argentina, Bolivia, Canada, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, United States, Uruguay

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Background Information: A proposal for the suppression of Resolution **60** is being submitted because this resolution is no longer needed.

Proposal(s):

IAP/14/85

SUP

~~**RESOLUTION 60**~~

~~**Relating to information on the propagation of radio waves used in the determination of the coordination area**~~

Reason: WP3M provided updated propagation material to TG1/6. Resolution no longer required.

Proposals for Agenda Item 1.4

to consider issues concerning allocations and regulatory aspects related to Resolutions **126** (WRC-97), **128** (WRC-97), **129** (WRC-97), **133** (WRC-97), **134** (WRC-97) and **726** (WRC-97)

Proposal for the addition of the Fixed-Satellite Service in the 40.5-42.5 GHz band in Region 1, Mobile-Satellite Service in the 40.5-41 GHz band and the Broadcast-Satellite Service in the 40-40.5 GHz band, and the use of the frequency range 37 – 43.5 GHz by terrestrial and satellite services

Submitted by the following Administrations:

[Antigua and Barbuda], [Bahamas], [Barbados], [Belize], [Brazil], [Chile], [Dominica], [Dominican Republic], [Ecuador], [Grenada], [Guatemala], [Guyana], [Haiti], [Honduras], [Jamaica], [Nicaragua], [Panama], [Paraguay], [Saint Lucia], [Saint Vincent and the Grenadines], [St. Kitts and Nevis], [Suriname], [Trinidad and Tobago], [Venezuela]

Argentina, Bolivia, Canada, Colombia, Costa Rica, El Salvador, Mexico, Peru, United States, Uruguay

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Background Information: WRC-97 added co-primary allocations for Fixed-Satellite Service (space-to-Earth) in Regions 2 and 3 and some countries of Region 1 in the band 40.5 - 42.5 GHz and upgraded worldwide secondary allocations to fixed service (FS) to co-primary status. This band is also allocated on a co-primary basis to the Fixed Service, Broadcasting Service, and Broadcasting Satellite Service (BSS).

Resolution **134 (WRC-97)** makes the date of the provisional application of the allocation to the FSS in Regions 1 and 3 in the band 40.5-42.5 GHz 1 January 2001, and calls for review of the allocation and provisional application date. On the basis of studies conducted in the ITU-R, it is appropriate to advance the date of the application of the FSS allocation in Regions 1 and 3 to 2 June 2000 (upon the conclusion of WRC-2000), and to extend the allocation to all of Region 1 (thereby enabling the removal of RR **S5.551C,** RR **S5.551D** and RR **S5.551E**, and the suppression of Resolution **134 (WRC-97**)).

The use of FSS allocations is subject to the ITU-R studies referred to in Resolutions **128** and **129 (**both **WRC-97)**. Resolution **133 (WRC-97)** deals with sharing of high-density FS applications (HDFS) with other services in the range 37-40 GHz. Since HDFS and ubiquitously deployed FSS and BSS terminals cannot share the same spectrum in the same area, it is necessary to identify regulatory solutions to meet the spectrum requirements for HDFS (both point-to-point and point-to-multipoint)**,** and FSS (both global and regional) in the range 37–51.4 GHz.

HDFS deployments can make sharing difficult with FSS systems, depending on the population of earth station receivers and the nature of the business plan**.** It is recognized that economy of scale is a key factor in the success of high density deployments of FS and FSS systems and that this will be enhanced by the degree of global spectrum harmonization.

A number of administrations are actively seeking spectrum for high density FS and FSS systems in the 37 - 42.5 GHz frequency range. Given the system characteristics, service requirements and the need to

provide global spectrum for FSS systems, it is anticipated that approximately 2 GHz of spectrum is required to meet future needs of high density FSS systems in this frequency range. Within the frequency range 37–42.5 GHz, it is proposed to use the band 37–40 GHz by high density FS applications and the band 40-42 GHz for high density FSS applications. The allocations to FS and FSS are retained in the range 37 - 42.5 GHz in order to provide flexibility to administrations to implement lower density applications subject to certain constraints.

Since it will no longer be possible to effectively implement MSS in the 39.5-40.0 GHz band given the proposed power flux-density limits in the 37.5-40.0 GHz band, it is necessary to add a secondary MSS allocation to the band 40.5-41.0 GHz.

It should also be noted that high density FSS applications are similar in nature to BSS systems, particularly in the delivery of multimedia and inter-active services. Taking this into account, it is proposed to align the broadcast satellite allocation with the high density FSS allocation in the 40-42 GHz band. This results in a new allocation to the BSS in the band 40-40.5 GHz. The alignment of FSS and BSS in the 40-42 GHz band also presents an opportunity to make available additional HDFS spectrum in the 42-43.5 GHz band.

It is proposed that the protection of the Radio Astronomy service in the frequency band 42.5 – 43.5 GHz be dealt with under the provisions of Resolution 128 (Revision WRC 2000).

The fixed service continues to evolve, and the fixed-satellite service has a requirement to establish at WRC-2000 the regulatory/procedural certainty that will enable networks that have been on file with the ITU's Radiocommunication Bureau since 1997 and earlier to proceed with implementation plans. Rather than continue to study sharing conditions within the ITU-R for another cycle, which will have the effect of freezing fixed service evolution and hampering the ability of fixed-satellite service networks to be established and globally deployed, the following proposals are made for modifications and additions to Article **S5**, Table **S21-4** of Article **S21**, Resolution **128** (WRC-97), and for the suppression of Resolutions **133** and **129** (both WRC-97). These proposals are intended to be considered as a comprehensive package that would establish on a worldwide basis the regulatory conditions that would permit the establishment and evolution of both the fixed service and the fixed-satellite service in the 37.5-42.5 GHz frequency range.

Proposal(s):

Article S5

37-43.5 GHz

IAP/14/ 86
MOD

Allocation to services		
Region 1	**Region 2**	**Region 3**
37-37.5	FIXED MOBILE SPACE RESEARCH (space-to-Earth) **MOD** S5.547 **ADD** S5.HDFS	
37.5-38	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE SPACE RESEARCH (space-to-Earth) Earth exploration-satellite (space-to-Earth) **MOD** S5.547 **ADD** S5.HDFS	
38-39.5	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Earth exploration-satellite (space-to-Earth) **MOD** S5.547 **ADD** S5.HDFS	
39.5-40	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth) Earth exploration-satellite (space-to-Earth) **MOD** S5.547 **ADD** S5.HDFS	

40-40.5	EARTH EXPLORATION-SATELLITE (Earth-to-space) FIXED FIXED-SATELLITE (space-to-Earth) **BROADCASTING-SATELLITE** MOBILE MOBILE-SATELLITE (space-to-Earth) SPACE RESEARCH (Earth-to-space) Earth exploration-satellite (space-to-Earth) **ADD** S5.SAT	
40.5-41 FIXED **FIXED-SATELLITE space-to-Earth)** BROADCASTING BROADCASTING-SATELLITE Mobile Mobile-satellite (space-to-Earth) ~~S5.551D~~ **ADD** S5.SAT	**40.5-41** FIXED FIXED-SATELLITE (space-to-Earth) ~~S5.551E~~ BROADCASTING BROADCASTING-SATELLITE Mobile Mobile-satellite (space-to-Earth) S5.551C **ADD** S5.SAT	**40.5-41** FIXED FIXED-SATELLITE (space-to-Earth) ~~S5.551E~~ BROADCASTING BROADCASTING-SATELLITE Mobile Mobile-satellite (space-to-Earth) S5.551C **ADD** S5.SAT
41-42 FIXED **FIXED-SATELLITE (space-to-Earth) MOD** S5.551B BROADCASTING BROADCASTING-SATELLITE Mobile ~~S5.551D~~ **ADD** S5.SAT	**41-42** FIXED FIXED-SATELLITE (space-to-Earth) **MOD** S5.551B ~~S5.551E~~ BROADCASTING BROADCASTING-SATELLITE Mobile S5.551C **ADD** S5.SAT S5.551F	**41-42** FIXED FIXED-SATELLITE (space-to-Earth) **MOD** S5.551B ~~S5.551E~~ BROADCASTING BROADCASTING-SATELLITE Mobile S5.551C S5.551F **ADD** S5.SAT

42-42.5 FIXED <u>FIXED-SATELLITE (space-to-Earth)</u> **ADD** S5.551X BROADCASTING BROADCASTING-SATELLITE Mobile **MOD** S5.551B ~~S5.551D~~ **MOD** S5.547 **ADD** S5.HDFS	**42-42.5** FIXED FIXED-SATELLITE (space-to-Earth) **ADD** S5.551X ~~S5.551E~~ BROADCASTING BROADCASTING-SATELLITE Mobile S5.551C ~~S5.551F~~ **MOD** S5.547 **ADD** S5.HDFS **MOD** S5.551B	**42-42.5** FIXED FIXED-SATELLITE (space-to-Earth) **ADD** S5.551X ~~S5.551E~~ BROADCASTING BROADCASTING-SATELLITE Mobile S5.551C S5.551F **MOD** S5.547 **ADD** S5.HDFS **MOD** S5.551B
42.5-43.5	FIXED FIXED-SATELLITE (Earth-to-space) S5.552 MOBILE except aeronautical mobile RADIO ASTRONOMY S5.149 MOD S5.547 **ADD** S5.HDFS	

Reason:

<u>Elevation of Fixed-Satellite Service (FSS) to primary allocation in all three regions in the 40.0-42.5 GHz band.</u>

With the exception of sharing issues and studies identified in Resolution 128**,** studies in ITU-R confirm the feasibility of the fixed-satellite service allocation in the bands 40.5-42.5 GHz, and the need for harmonized global allocations. With the elevation of the allocation to full primary status in all 3 regions, the footnote allocation for countries in Region 1 can be removed. Those countries that are listed or that have territories listed in **S5.551C** should give consideration to whether the alternative allocation in certain countries and territories in Regions 2 and 3 can be suppressed. Acceleration of the effective date allows for removal of the reference to Resolution **134 (WRC-97).** In advancing this proposal, it is proposed that broadcasting-satellite service and fixed-satellite service systems in the band 42.0-42.5 GHz not be implemented until technical and operational measures have been identified and agreed within ITU-R to protect the radio astronomy service in the band 42.5-43.5 GHz from harmful interference.

<u>Addition of Broadcasting-Satellite Service (BSS) primary allocation in the 40.0-40.5 GHz band.</u>

This consequential allocation is necessary since it may not be possible to implement BSS in the 42.0-42.5 GHz band without causing interference detrimental to radio astronomy observations in the 42.5-43.5 GHz band. Resolution 128 (MOD WRC 00)

calls for additional study within the ITU-R to determine appropriate protection methods for the Radio Astronomy Service (RAS) from BSS in the band 42.0-42.5 GHz.

Addition of Mobile-Satellite Service (MSS) secondary allocation in the 40.5-41.0 GHz band. This consequential allocation is necessary since it will no longer be possible to effectively implement MSS in the 39.5-40.0 GHz band given the proposed power flux density limits in the 37.5-40.0 GHz band.

IAP/14/ 87
MOD

S5.547 The bands 31 .8 – 33.4 GHz, 37 – 40 GHz, 42-43.5 GHz, 51.4 – 52.6 GHz, 55.78 – 59 GHz and 64 - 66 GHz are available for high-density applications in the fixed service (see Resolution **726 (MOD WRC-00)**).

Reason: Many administrations throughout the world have permitted the deployment of high density fixed systems in various parts of the frequency range 37 – 40 GHz. The band 42 - 43.5 GHz is very suitable for HDFS applications given the radio astronomy use of the band 42.5-43.5 GHz.

IAP/14/ 88

ADD

S5.HDFS In the bands 37.0-40.0 GHz and 42.0-43.5 GHz, administrations should take the availability of these bands for high-density fixed service into account when considering the use of other allocated services.

Reason: To encourage and facilitate fixed service use of the subject bands.

IAP/14/ 89

ADD

S5.SAT Terrestrial radiocommunications services shall not constrain the future use, development, and deployment of high-density applications in the fixed-satellite service in the band 40.0-42.0 GHz, or of the mobile-satellite service in the band 40.0-40.5 GHz.

Reason: To encourage and facilitate fixed-satellite service and mobile-satellite service use of the subject bands. The band 40 – 42 GHz meets the spectrum requirements for high-density applications in the fixed-satellite service in this frequency range. In addition, it is necessary to recognize the global nature of FSS applications in this frequency range, and consequently, the designation should be made to all three regions. It should be noted that the band 40 – 42 GHz is also allocated on a primary basis to the BSS. It is anticipated that high density FSS applications are similar in nature to BSS systems, particularly in the delivery of multimedia and inter-active services.

IAP/14/90
MOD

S5.551B The use of the band ~~41.5~~ 42.0-42.5 GHz by the broadcasting-satellite service and fixed-satellite service (space to-Earth) is subject to Resolution **128** (MOD WRC-2000 ~~97~~). The limitation on the broadcasting-satellite service shall apply to systems where advanced publication materials are received by the Bureau after 2 June 2000. For non-geostationary fixed-satellite service systems operating in the band 41.5-42.0 GHz, see also Resolution **128** (MOD WRC-2000).

Reason: It is recognized that the use of adjacent spectrum by the fixed-satellite service below 42.5 GHz and its impact on radioastronomy operations above 42.5 GHz is under study within the ITU-R. However, to give timely access to the FSS in the 40 – 42 GHz range and provide adequate protection to radioastronomy service while studies are

underway, it is reasonable to limit the scope of Resolution **128** to 500 MHz below 42.5 GHz. Studies on the protection of the radioastronomy service from unwanted emissions should also apply to the broadcasting-satellite service in the band 42.0-42.5 GHz.

IAP/14/91 SUP

~~**S5.551D**~~

Reason: With the elevation of the FSS allocation to full primary status in all 3 regions, the footnote allocation for countries in Region 1 can be removed.

IAP/14/92 SUP

~~**S5.551E**~~

Reason: Consequential to the suppression of Resolution 134, and with the elevation of the allocation to full primary status in all 3 regions, the footnote allocation for countries in Region 1 can be removed.

IAP/14/ 93 SUP

~~**S5.551F** Different category of service: in Japan, the allocation of the band 41.5 – 42.5 GHz to the mobile service is on a primary basis (see No. **S5.33**). (WRC-97)~~

Reason: With the separation of the Table of Frequency Allocations into 3 regions, as opposed to the current table where Regions 2 and 3 are joined, it is appropriate to suppress No. **S5.551F** from Region 2, as it applies exclusively to Region 3.

IAP/14/94 ADD

S5.551X Use of the band 42.0-42.5 GHz by the fixed-satellite service shall be limited as noted in the *resolves* of Resolution **128 (MOD WRC-2000)**.

Reason: To reduce the potential harmful interference caused to the radio astronomy service in the 42.5-43.5 GHz band.

IAP/14/95
MOD

Table S21-4 (*END)*

Frequency band	Service	Limit in dB(W/m^2) for angle of arrival (δ) above the horizontal plane			Reference bandwidth
		0° - 5°	**5° - 25°**	**25° - 90°**	
31.0-31.3 GHz 34.7-35.2 GHz (space-to-Earth transmissions referred to in No. **S5.550** on the territories of countries listed in No. **S5.549**) ~~37.0-40.5 GHz~~	~~Fixed-satellite~~ ~~Mobile-satellite~~ Space research	-115~~[10]~~	-115 + 0.5 (δ-5) ~~[10]~~	-105~~[10]~~	1 MHz
37.0-38.0 GHz	Space research (Non-geostationary)	-120[17]	-120 + 0.75 (δ-5)[17]	-105[17]	1 MHz
37.0-38.0 GHz	Space research (Geostationary)	-125	-125 + (δ-5)	-105	1 MHz
37.5-40.0 GHz	Fixed-satellite (Non-geostationary) Mobile Satellite (Non-geostationary)	-130[10, 16]	**5°- 15°**: -130 + .85(δ-5)[10, 16] **15° - 25°**: -121.5 + .3(δ-15)[10, 16]	-118.5[10, 16]	1 MHz
37.5-40.0 GHz	Fixed-satellite (Geostationary) Mobile Satellite (Geostationary)	-135 [16]	**5°- 15°**: -135 + 1.35(δ-5)[16] **15° - 25°**: -121.5 + .3(δ-15)[16]	-118.5[16]	1 MHz
40.0-42.0 GHz	Fixed-Satellite (Non-geostationary) Mobile-Satellite	-115[10]	-115 + 0.5 (δ-5)[10]	-105[10]	1 MHz
40.0-42.0 GHz	Fixed-Satellite (Geostationary)	-120	**5° - 15°**: -120 + (δ-5) **15° - 25°**: -110 + 0.5 (δ-15)	-105	1 MHz
42.0-42.5 GHz	Fixed-satellite (Non-geostationary)	-130[16]	**5°- 15°**: -130 + .85(δ-5)[16] **15° - 25°**: -121.5 + .3(δ-15)[16]	-118.5[16]	1 MHz
42.0-42.5 GHz	Fixed-satellite (Geostationary)	-135[16]	**5°- 15°**: -135 + 1.35(δ-5)[16] **15° - 25°**: -121.5 + .3(δ-15)[16]	-118.5[16]	1 MHz

IAP/14/96
MOD

10 **S21.16.4** The values given in this box shall apply to emissions of space stations of non-geostationary satellites in networks operating with 99 or fewer satellites. Further study concerning the applicability of these values is necessary in order to apply them to networks operating with 100 or more satellites.~~until such time as modified by a competent world radiocommunication conference~~.

IAP/14/97
ADD

16 **S21.16.10** The pfd limit in this table entry may be exceeded by not more than 13.5 dB under fade conditions, and the Radiocommunications Bureau's examination under Nos. S9.35 and/or S11.31 shall be based on the levels in this table entry plus 13.5 dB. In order to operate in excess of the levels in this table entry, the agreement of all administrations whose territory is within the half-power beamwidth of the satellite antenna beam shall have been obtained. The percentage of time that the values in this table entry may be exceeded shall be determined by reference to an appropriate ITU-R recommendation (see Resolution JJJ).

IAP/14/98
ADD

17 **S21.16.11** During the launch and deployment phase of deep space facilities, the values in this box may be exceeded for short periods of time.

Reason: The PFD-review objectives of Resolutions **133 (WRC-97)** and **129 (WRC-97)** have been met. The values stated above for FSS systems are consistent with the Report of the Conference Preparatory Meeting for WRC-2000 and those included in a draft new recommendation approved by the ITU-R. See Draft New Recommendation [4-9S/AH1], Maximum Allowable Values of Power Flux-Density at the Surface of the Earth Produced by Non-Geostationary Satellites in the Fixed-Satellite Service Operating in the 37.5-40.5 GHz and 40.5-42.5 GHz Bands to Protect the Fixed Service. The studies under Resolution **129** were done with respect to the Fixed Service but are assumed to be adequate for protecting the co-primary terrestrial Broadcasting Service as well. In addition, studies have demonstrated the suitability for application to FSS systems of higher pfd limit in the 40.5-42.5 GHz band.

IAP/14/99
SUP

~~**Resolution 133 (WRC-97)**~~

~~**Sharing Between the Fixed Service and Other Services in the Band 37-40 GHz**~~

Reason: Consequential

~~**Resolution 129 (WRC-97)**~~

IAP/14/100
SUP

~~**Criteria and Methodologies for Sharing Between the Fixed-Satellite Service and Other Services with Allocations in the Band 40.5-42.5 GHz**~~

Reason: Consequential

IAP/14/101
SUP

~~**Resolution 134 (WRC-97)**~~

~~**Use of the frequency band 40.5-42.5 GHz by the fixed-satellite service**~~

Reason: Consequential to change of FSS allocation.

IAP/14/102
MOD

RESOLUTION 128 (MOD WRC-~~97~~ 00)

Allocation to the ~~fixed~~-satellite service(s) (space-to-Earth) in the ~~41.5~~42 - 42.5 GHz band, use of the 41.5-42 GHz band by non-geostationary fixed-satellite service systems, and protection of the radio astronomy service in the 42.5 – 43.5 GHz band

The World Radiocommunication Conference (~~Geneva, 1997~~Istanbul, 2000),

Considering

a) that ~~this Conference~~ WRC-97 added a primary allocation to the fixed-satellite service (space-to-Earth) in the band 4~~1.5~~ 42 - 42.5 GHz in Regions 2 and 3 and in certain countries in Region 1, that this Conference expanded this allocation to include all of Region 1, and that this band is adjacent to the band 42.5 - 43.5 GHz which is allocated, *inter alia*, to the radio astronomy service for both continuum and spectral line observations;

b) that there is also a worldwide primary allocation to the broadcast-satellite service in the 42.0-42.5 GHz band,

c) that unwanted emissions from space stations in the broadcasting-satellite service and fixed-satellite service (space-to-Earth) in the band 4~~1.5~~ 42 - 42.5 GHz may result in harmful interference to the radio astronomy service in the band 42.5 - 43.5 GHz;

d) that aggregate unwanted emissions from space stations in the non-geostationary fixed-satellite service (space-to-Earth) in the band 41.5-42.0 GHz may result in harmful interference to the radio astronomy service in the band 42.5-43.5 GHz;

e) that various technical means may be used to reduce these unwanted emissions from space stations in the broadcasting-satellite and fixed-satellite service;

f) that a limited number of radio astronomy stations worldwide require protection, and that there may be means to limit the susceptibility of radio astronomy receivers to interference,

taking into account

the relevant provisions of the Radio Regulations,

resolves

that administrations shall not implement broadcast satellite service systems where advanced publication materials are received by the Bureau after 2 June 2000 and fixed-satellite systems in the band ~~41.5~~42 - 42.5 GHz until technical and operational measures have been identified and agreed within ITU-R to protect the radio astronomy service from harmful interference in the band 42.5 - 43.5 GHz,

invites ITU-R

~~1 to study, as a matter of urgency, the harmful interference that space stations in the fixed-satellite service (space-to-Earth) operating in the band 41.5 - 42.5 GHz may cause to stations in the radio astronomy service operating in the band 42.5 - 43.5 GHz;~~

1 to study, as a matter of urgency, the harmful interference that space stations in the broadcasting-satellite service where advanced publication materials are received by the Bureau after 2 June 2000 and fixed-satellite service (space-to-Earth) operating in the band ~~41.5~~42.0 - 42.5 GHz may cause to stations in the radio astronomy service operating in the band 42.5 - 43.5 GHz;

2 to identify technical and operational measures that may be taken to protect stations in the radio astronomy service operating in the band 42.5 - 43.5 GHz, including geographical separation and out-of-band emission limits to be applied to space stations operating in the broadcasting-satellite service where advanced publication materials are received by the Bureau after 2 June 2000 and fixed-satellite service in the band ~~41.5~~2 - 42.5 GHz, as well as measures that may be implemented to reduce the susceptibility of stations in the radio astronomy service to harmful interference;

3 to report on the results of ~~these~~ the studies in invites 1 and 2 to the Conference Preparatory Meeting for WRC-~~99~~02/03,

4 to complete the ongoing ITU-R studies on aggregate unwanted emissions from non-geostationary fixed satellite service systems operating in the band 41.5-42.0 GHz for protection of the radio astronomy service in the band 42.5-43.5 GHz.

urges administrations

1 to participate actively in the aforementioned studies by submitting contributions to ITU-R, and

2 when implementing non-geostationary fixed satellite service systems, to take into account the results of the studies identified in *invites* ITU-R 4.

requests

WRC-~~99~~02/03 to take appropriate action based on those studies.

Reason: Consequential to the change of the FSS allocation to primary status and the required ITU-R studies have not been completed.

IAP/14/103
ADD

RESOLUTION JJJ (WRC-2000)

Determination of the Percentage of Time during which the Fixed-Satellite Service (Space-to-Earth) Links in the 37.5-40.0 GHz and 42.0-42.5 GHz Band may increase power to overcome fade conditions, while taking into account the impact on the performance of fixed systems

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that this Conference established power flux-density limits for fixed-satellite service (space-to-Earth) in the 37.5-40.0 GHz and 42.0-42.5 GHz bands;

b) that this Conference determined that the power flux-density limits in the 37.5-40 GHz and 42.0-42.5 GHz bands on the fixed-satellite service may be exceeded by not more than 13.5 dB under fade conditions;

c) that there is a need for further study to determine the percentage of time during which fade conditions will require the use of increased power on fixed-satellite service links in the 37.5-40 GHz and 42.0-42.5 GHz bands;

recognizing

that the percentage of time during which fade conditions will exist on fixed-satellite service links in the 37.5-40 and 42.0-42.5 GHz bands will likely be small for significant fade depths, and is expected to be in the range of between one percent and five percent of the time; however, further study is needed;

recognizing further,

that operation of fixed-satellite service links with increased power to overcome fade may affect the performance of fixed service links operating in unfaded conditions in the same frequency band;

resolves to invite ITU-R

1 taking into account the *recognizing* and *recognizing further* above, to conduct studies as a matter of urgency toward the development of an appropriate

recommendation that establishes the relationship between the percentage of time and the amount of increased power with which fixed-satellite service links in the 37.5-40 GHz and 42.0-42.5 GHz bands may operate at increased power levels to overcome fade conditions, taking into account the impact on the performance of fixed systems;

2 to report on the results of these studies to the Conference Preparatory Meeting for WRC-2002/03,

requests

WRC-2002/03 to take appropriate action based on the results of those studies.

Reason: To determine the appropriate percentage of time during which fade conditions exist on FSS links in the 37.5-40 and 42.0-42.5 GHz bands pursuant to Note 16 to Table S21-4.

IAP/14/104
MOD

RESOLUTION 726 ~~(WRC-97)~~ (Rev. WRC-00)

Frequency bands above 30 GHz available for high-density applications in the fixed service

The World Radiocommunication Conference ~~(Geneva, 1997)~~ (Istanbul, 2000),

considering

a) that there is a dramatically increasing demand for high-density applications in the fixed service resulting from the deployment of new mobile networks and from the rapid worldwide deregulation in the provision of local broadband services, including multimedia;

b) that the frequency range from 30 GHz to about 50 GHz is the range preferred to satisfy initial requirements, as indicated in *considering a)*, while the bands above about 50 GHz are preferred for similar applications but which take technical advantage of high atmospheric absorption;

c) that the lower part of the spectrum above 30 GHz has advantages for the fixed service in areas where longer path lengths are necessary;

d) that the 38 GHz band is already heavily used by many administrations for high-density applications in the fixed service;

e) that the needs of other services to which the relevant frequency bands are already allocated must be taken into account;

f) that the band 37-37.5 GHz is being planned for use by the space research service (space-to-Earth) to provide moon-to-Earth and planetary communication links;

g) that the band 37-38 GHz is being planned for use by the space research service to provide space based very long baseline interferometry;

h) that the deployment of high-density applications in the fixed service in some bands potentially presents sharing difficulties with other primary services allocated to the same band, e.g. the fixed-satellite service;

i) that operations in the space services, such as in the fixed-satellite service, in those bands used by high-density applications in the fixed service may lead to sharing difficulties;

j) that there is a need for global harmonization of new and existing allocations of radio frequency bands to facilitate coordination between administrations and encourage development of competitive products, through economies of scale, and the worldwide introduction of new telecommunication services, including the provision of reliable global information infrastructure access at an affordable cost,

resolves

IAP/14/105
MOD

That administrations should take into account that the bands 31.8-33.4 GHz [*], 37-40 GHz, 42-43.5 GHz, 51.4-52.6 GHz, 55.78-59 GHz and 64-66 GHz are available for high-density applications in the fixed service, when considering allocations or other regulatory provisions in relation to these bands,

[*] ~~The date of provisional application of this allocation shall be in conformity with Resolution 126 (WRC-97).~~

requests ITU-R

1 to undertake studies leading to the identification of system characteristics of high-density systems in the fixed service in certain ~~the~~ bands listed in the *resolves*;

IAP/14/106
MOD

2 to develop ~~undertake~~, as a matter of urgency, ~~studies of~~ recommendations addressing technical and operational criteria and of methods to facilitate sharing between high-density systems in the fixed service and other services in the bands listed in the *resolves*,

urges administrations

To participate actively in the aforementioned studies by submitting contributions to ITU-R.

Reason: Consequential.

WRC-2000 Agenda item 1.5

To consider regulatory provisions and possible additional frequency allocations for services using high altitude platform stations, taking into account the results of ITU-R studies conducted in response to Resolution **122** (WRC-97);

Proposal to modify Res 122, High Altitude Platform Stations in the fixed service

Submitted by the following Administrations:

[Antigua and Barbuda], [Bahamas], [Barbados], [Belize], [Brazil], [Canada], [Chile], [Dominica], [Dominican Republic], [Ecuador] [El Salvador], [Grenada], [Guatemala], [Guyana], [Haiti], [Honduras], [Jamaica], [Nicaragua], [Panama], [Saint Lucia], [Saint Vincent and the Grenadines], [St. Kitts and Nevis], [Suriname], [Trinidad and Tobago], [Venezuela]

Argentina, Bolivia, Colombia, Costa Rica, Mexico, Paraguay, Peru, United States, Uruguay

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Background Information: Resolution **122 (WRC-97),** "Use of the bands 47.2 – 47.5 GHz and 47.9 – 48.2 GHz by high altitude platform stations in the fixed service and by other services", instructs the Director of the Radiocommunication Bureau, that from 22 November 1997, to accept notices in the 47.2 – 47.5 and 49.2 – 48.2 GHz only for high altitude platform stations in the fixed service and for feeder links for the broadcasting-satellite services pending review of sharing studies between co-primary services in the band. On the basis of studies conducted in the ITU-R, it is appropriate to modify Resolution **122** (WRC-97) to take account of draft new Recommendation [4-9S/AAX] that establishes the performance parameters for certain FSS antennas that can share with the HAPS system and to take account of the need for continued studies.

Proposal(s):

IAP/14/ 107
MOD

RESOLUTION 122 (~~WRC-97~~) (MOD WRC-00)

Use of the bands 47.2-47.5 GHz and 47.9-48.2 GHz by high altitude platform stations in the fixed service and by other services

The World Radiocommunication Conference (~~Geneva, 1997~~Istanbul, 2000),

considering

a) that the band 47.2-50.2 GHz is allocated to the fixed, mobile and fixed-satellite services on a co-primary basis;

b) that ~~this Conference has~~WRC-97 made provision for operation of high altitude platform stations, also known as stratospheric repeaters, within the fixed service in the bands 47.2-47.5 GHz and 47.9-48.2 GHz;

c) that ITU has among its purposes "to promote the extension of the benefit of the new telecommunication technologies to all the world's inhabitants" (No. 6 of the Constitution of the ITU (Geneva, 1992));

d) that systems based on new technologies using high altitude platforms in the bands 47.2-47.5 and 47.9-48.2 GHz will be able to provide high-capacity, competitive services to urban and rural areas;

e) that high altitude platform systems are in an advanced stage of development and some countries have notified such systems to ITU;

f) that WRC-97 adopted a new definition of high altitude platform stations in Article **S1**, modified No. **S11.24** and added No. **S11.26** in the Radio Regulations providing for notices relating to assignments for high altitude platform stations in the bands 47.2-47.5 GHz and 47.9-48.2 GHz and that the Radio Regulations Board issued a provisional rule of procedure concerning notification periods in No. **S11.24/1228** in February 1997;

g) that ~~in spite of the urgency attached to the development of such systems, technical, sharing and regulatory issues should be studied in order to achieve the most efficient use of the spectrum available for these systems~~ the ITU-R has confirmed that in certain cases sharing is feasible between high altitude platform stations and the FSS;

h) that technical studies are still required in order to ascertain the extent to which sharing of the bands 47.2-47.5 GHz and 47.9-48.2 GHz is feasible between systems using high altitude platforms in the fixed service and systems in the fixed, fixed-satellite (other than the specific deployment FSS scenario referenced draft new Recommendation [4-9S/AAX] in and mobile services, and to ascertain the requirements to protect radio astronomy services in adjacent bands from spurious emissions;

i) that the radio astronomy service has primary allocations in the bands 42.5-43.5 GHz and 48.94-49.04 GHz;

j) that ITU-R studies are already under way on the preferred characteristics of systems using high altitude platforms and the feasibility of sharing between these systems and systems of other services and between these systems and other systems in the fixed service (Questions ITU-R 212/9, ITU-R 218/9 and ITU-R 251/4) and that although Draft New Recommendations [4-9S/AAX] and [9B/HAPS2] have been developed, further studies are required to fully assess the implications of these scenarios and to consider the effect of mitigation techniques on increasing shared use of these bands by HAPS and other systems;

k) that No. **S5.552** urges administrations to reserve fixed-satellite service use of the band 47.2-49.2 GHz for feeder links for the broadcasting-satellite service, and that preliminary ITU-R studies indicate that high altitude platform stations in the fixed service may share with broadcasting-satellite feeder links;

l) that the development of services using high altitude platform stations in these bands requires major investment and that manufacturers and operators should be given the confidence to make the necessary investment in these applications,

resolves

1 to urge administrations to facilitate coordination between high altitude platform stations in the fixed service operating in the bands 47.2 - 47.5 GHz and 47.9 - 48.2 GHz and other co-primary services in their territory and adjacent territories;

2 that, on a provisional basis, the procedures of Article **S9** shall be used for coordination between satellite systems and high altitude platform systems;

3 to request ITU-R to ~~carry out urgently~~ continue studies on the appropriate technical sharing criteria for the situations referred to in *considering h)*, with priority given to the sharing with other systems in the fixed and fixed-satellite service~~s, in particular the determination of the appropriate geographical separation from feeder links in the broadcasting-satellite service;~~

4 that WRC-~~99~~03 should review the results of these studies and consider refinement of the regulatory provisions for ~~that might facilitate a broader application of these~~ high altitude platform technologies,

instructs the Director of the Radiocommunication Bureau

1 that notices concerning high altitude platform stations that were received by the Bureau prior to 22 November 1997, and provisionally recorded in the Master International Frequency Register in accordance with the provisional rule of procedure issued by the Board, shall be maintained;

2 that from 22 November 1997, and pending review of the sharing studies in *considering h)* and review of the notification process by ~~WRC-99~~ WRC-2003, the Bureau shall accept notices in the bands 47.2-47.5 GHz and 47.9-48.2 GHz only for high altitude platform stations in the fixed service and feeder links for the broadcasting-

satellite service, shall continue to process notices for fixed-satellite service networks (except for feeder links for the broadcasting-satellite service) for which complete information for advance publication has been received prior to 27 October 1997, and shall inform the notifying administrations accordingly.

Reason: To further develop possible sharing criteria among high altitude platform stations and other services in the 47.2-47.5 GHz and 47.9-48.2 GHz band.

WRC-2000 Agenda Item 1.6.1

Review of spectrum and regulatory issues for advanced mobile applications in the context of IMT-2000, noting that there is an urgent need to provide more spectrum for the terrestrial component of such applications and that priority should be given to terrestrial mobile spectrum needs, and adjustments to the Table of Frequency Allocations as necessary.

Proposal to Identify Additional Spectrum for IMT-2000

Submitted by the following Administrations:

[Antigua and Barbuda], [Bahamas], [Barbados], [Belize], [Bolivia], [Brazil], [Dominica], [Dominican Republic], [Ecuador], [Grenada], [Guyana], [Haiti], [Honduras], [Jamaica], [Nicaragua], [Panama], [Paraguay], [Saint Lucia], [Saint Vincent and the Grenadines], [St. Kitts and Nevis], [Suriname], [Trinidad and Tobago], [United States]

Argentina, Canada, Chile, Colombia, Costa Rica, El Salvador, Guatemala, Mexico, Peru, Uruguay, Venezuela

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Background Information: In the Americas, cellular and PCS services are experiencing significant growth, and there is strong interest in the evolution of these services towards IMT-2000. In view of the present PCS use of the 2 GHz band and the MSS allocations in the frequency spectrum currently identified for IMT-2000 by **RR S5.388**, there is limited clear spectrum available for the implementation of IMT-2000.

In order to consider additional requirements for the terrestrial component of IMT-2000, current PCS and cellular services should be able to evolve to IMT-2000 in existing bands to the extent possible. ITU-R Task Group 8/1 (TG 8/1) efforts towards global harmonisation of technology & spectrum, and in particular, the forecast of 160 MHz of additional spectrum beyond that currently in the bands used for first and second generation mobile systems (e.g. cellular and PCS in Region 2) to implement IMT-2000 should be supported.

Proposals to identify frequency bands to accommodate the additional forecasted requirements should take into account the principles of placing priority on the selection of bands already allocated to the mobile service and of taking into consideration the impact on existing uses of the spectrum. Also, consideration should be given to the possibility of achieving harmonization through all or parts of the identified band(s) with other regions of the world. Globally harmonized spectrum will greatly assist in the successful of IMT-2000 system deployment and enhance roaming services.

The band, 1710 - 1850 MHz, has the advantages of being immediately adjacent to the spectrum currently identified for IMT-2000 and it is also used today in parts of the world for PCS, increasing the possibility of harmonization with other regions.

The frequency range 1710 – 1885 MHz should be identified worldwide for additional spectrum for advanced mobile applications in the context of IMT-2000 through a modification of footnote **S5.388**.

Proposal(s):

1710 – 2170 MHz

IAP/14/108
MOD

Allocation to services		
Region 1	Region 2	Region 3
1710 – 1930		
FIXED MOBILE S5.380 S5.149 S5.341 S5.385 S5.386 S5.387 **MOD** S5.388		

IAP/14/109
MOD

S5.388 The bands <u>1710 – 1885 MHz,</u> 1885 – 2025 MHz, and 2110 – 2200 MHz are intended for use, on a worldwide basis, by administrations wishing to implement International Mobile Telecommunications-2000 (IMT-2000). Such use does not preclude the use of these bands by other services to which they are allocated. The bands should be made available for IMT-2000 in accordance with Resolution 212 (Rev. WRC-~~97~~<u>00</u>)

Reason: The frequency range 1710 - 1885 MHz has, in many parts of the world, already been impacted by the introduction of earlier generation personal mobile systems (For example, the introduction of GSM 1800 in Europe and other parts of the world in the frequency range 1710 - 1785/1805 - 1880 MHz and PCS in the Americas in 1850 - 1990 MHz). These pre-IMT-2000 systems are expected to have the capability to evolve to IMT-2000. In addition, this frequency range, 1710 - 1885 MHz is adjacent to the spectrum currently identified for IMT-2000, thus providing a large block of contiguous spectrum for future IMT-2000 systems. These attributes will facilitate cost-effective expansion of existing systems to meet advanced mobile applications in the context of IMT-2000 requirements.

IAP/14/110
MOD

RESOLUTION 212 (Rev.. WRC-~~97~~00)

Implementation of International Mobile Telecommunications-2000 (IMT-2000)*

The World Radiocommunication Conference (~~Geneva, 1997~~Istanbul, 2000),

considering

a) that ITU-R has recommended the 1-3 GHz band as the most suitable for IMT-2000;

~~*b)* that ITU-R has recommended approximately 60 MHz for use by personal stations and approximately 170 MHz for use by mobile stations;~~

~~*c)* that ITU-R has recognized that space techniques are an integral part of IMT-2000;~~

~~*d)* that, in No. **S5.388**, this Conference has identified bands to accommodate this future service,~~

b) that WARC-92 identified 230 MHz for IMT-2000 by regulatory provision of S5.388;

c) that ITU-R identified a further requirement of 160 MHz in addition to the spectrum identified in S5.388 and also the spectrum currently used by earlier generations of personal communications;

d) that ITU-R has recognized that space techniques are an integral part of IMT-2000;

e) that, WARC-92 identified the worldwide allocations for the mobile satellite service as part of the satellite component of IMT-2000;

f) that ITU-R has completed the development of recommendations on detail specifications of the radio interface of IMT-2000.

g) that harmonized worldwide bands for IMT-2000 is desirable to achieve benefits of economies of scale.

considering further

~~*a)* that ITU-R has not completed its studies regarding duplexing methods, modulation techniques, channelling arrangements, signalling or communication protocols;~~

~~*b)* that no worldwide intersystem numbering plan currently exists that would facilitate worldwide roaming,~~

a) that WRC-2000 identified XXX MHz of additional spectrum for the terrestrial component of IMT-2000,

b) that WRC-2000 identified the bands for the satellite component of IMT-2000.

noting

a) that the implementation of the terrestrial component of IMT-2000 ~~in the bands 1885 – 2025 MHz and 2110 – 2200 MHz~~ is expected to commence around the year 2000, subject to market and technical considerations;

b) that the availability of the satellite component of IMT-2000 ~~in the bands 1980 – 2010 MHz and 2170 – 2200 MHz simultaneously with the terrestrial component of IMT-2000 in the bands identified in No. S5.388~~ would improve the overall implementation and the attractiveness of IMT-2000 to both developed and developing countries,

c) that ITU-R has identified additional work to address further developments in advanced mobile systems including IMT-2000 applications and applications beyond IMT-2000.

~~*invites administrations*~~

~~to give due consideration to the accommodation of the other services currently operating in these bands when implementing IMT-2000,~~

invites ITU-R

to continue its studies ~~with a view to developing suitable and acceptable technical characteristics for IMT-2000 that will facilitate worldwide use and roaming,~~ on further enhancements of IMT-2000 including the provision of Internet Protocol (IP) based applications and optimized arrangements for the harmonized use of spectrum identified for IMT-2000,and ensure that IMT-2000 can also meet the telecommunication needs of the developing countries and rural areas,

invites ITU-T

a) to complete its studies of signal~~l~~ing and communication protocols;

b) to develop a common worldwide intersystem numbering plan and associated network capabilities that will facilitate worldwide roaming,

resolves

that administrations which implement IMT-2000:

a) should make the necessary ~~frequencies~~ spectrum available for system development;

b) should use those frequencies when IMT-2000 is implemented;

c) should use the relevant international technical characteristics, as identified by ITU-R and ITU-T Recommendations.

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*IMT-2000 was previously known as Future Public Land Mobile Telecommunication Systems (FPLMTS).

Reason: Resolution 212 was modified to make it generally applicable to any band designated for IMT-2000 systems under RR **S5.388**.

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review of spectrum and regulatory issues for advanced mobile application in the context of IMT-2000, noting that there is an urgent need to provide more spectrum for the terrestrial component of such applications and that priority should be given to terrestrial mobile spectrum needs, and adjustments to the table of frequency allocations as necessary

Proposal for NOC in the 2 700 – 2 900 Band

Submitted by the following Administrations:

[Antigua and Barbuda], [Bahamas], [Barbados], [Belize], [Brazil], [Canada], [Dominica], [Dominican Republic], [Grenada], [Guyana], [Haiti], [Honduras], [Jamaica], [Nicaragua], [Panama], [Peru], [Saint Lucia], [Saint Vincent and the Grenadines], [St. Kitts and Nevis], [Suriname], [Trinidad and Tobago]

Argentina, Bolivia, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Mexico, Paraguay, United States, Uruguay, Venezuela

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Background Information: CITEL proposes NOC for the band 2 700-2 900 MHz. This band is used extensively throughout the world for meteorological radars and other radionavigation and radiolocation systems. The impact of an allocation for mobile service use by IMT-2000, on these critical radar operations has not been studied by the ITU-R.

The 2700-2900 MHz band is used for aeronautical radionavigation radars providing essential safety-of-life related terminal approach guidance for commercial aircraft. The NEXRAD weather radar system, operating at 2700-2900 MHz, also provides weather location and prediction information critical for public safety. Studies made during the implementation of NEXRAD have shown that air traffic control and weather radar cannot operate in the same band and in the same vicinity of marine radars and racons without causing interference.

Working Party 8B, in a liaison statement to Task Group 8/1, expressed serious concerns that TG8/1 was recommending critical radionavigation and radiolocation bands via CPM text to WRC-2000 for possible reallocation to the Mobile Service exclusively without consulting the responsible working party.

The CPM text concludes that, given the technical characteristics of the radionavigation, radiolocation and meteorological radars, (e.i.r.p. in the order of 1 GW in some systems and the trend towards high duty cycles), and the need to operate in accordance with the protection criteria contained in ITU-R recommendations, sharing with IMT-2000 systems is considered to be feasible only when explicitly confirmed by ITU-R sharing studies.

Proposal(s):

2 700-2 900 MHz

IAP/14/111
NOC

Allocation to services		
Region 1	**Region 2**	**Region 3**
2 700-2 900	AERONAUTICAL RADIONAVIGATION S5.337 Radiolocation S5.423 S5.424	

Reasons: The band 2700-2900 MHz is used worldwide by radar systems critical for flight safety and weather reporting.

WRC-2000 Agenda item 1.10

to consider results of ITU-R studies carried out in accordance with Resolution **218** (WRC-97) and take appropriate action on this subject.

Proposal to modify Footnotes S5.353A and S5.357A

Submitted by the following Administrations:

[Antigua and Barbuda], [Bahamas], [Barbados], [Belize], [Brazil], [Chile], [Costa Rica], [Dominica], [Dominican Republic], [El Salvador], [Grenada], [Guyana], [Haiti], [Honduras], [Jamaica], [Nicaragua], [Panama], [Peru], [Saint Lucia], [Saint Vincent and the Grenadines], [St. Kitts and Nevis], [Suriname], [Trinidad and Tobago], [Venezuela]

Argentina, Bolivia, Canada, Colombia, Ecuador, Guatemala, Mexico, Paraguay, United States, Uruguay

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Background Information: In order to accommodate AMS(R)S traffic, it would be necessary that all MSS systems using this spectrum, within a certain geographical area, be technically able to release all, or parts, of the spectrum to any MSS operator that has a requirement for priority 1 to 6 AMS(R)S traffic. The technical and operational requirements for achieving such transfer of AMS(R)S spectrum resources would have to be developed by ICAO and the MSS system operators, and then implemented by MSS operators according to agreed upon specifications. Only MSS systems compliant with these requirements should have access to the 10 MHz identified in S5.357 A of paired generic MSS spectrum to ensure the availability of this spectrum to satisfy AMS(R)S priority 1 to 6 communications.

The proposed resolution is intended to replace Resolution **218** and calls for the ITU-R to study and develop the technical and operational requirements and specifications for intra-system and inter-system prioritization and pre-emption methods.

Proposal(s):

IAP/14/112
MOD

1 535-1 559 MHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
1 535-1 559	MOBILE-SATELLITE (space-to-Earth) S5.341 S5.351 **MOD** S5.353A S5.354 S5.355 S5.356 S5.357 **MOD** S5.357A S5.359 S5.362A	

IAP/14/113
MOD

1 626.5-1 660 MHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
1 626.5-1 660	MOBILE-SATELLITE (Earth-to-space) S5.341 S5.351 **MOD** S5.353A S5.354 S5.355 **MOD** S5.357A S5.359 S5.362A S5.374 S5.375 S5.376	

IAP/14/114
MOD

S5.353A In applying the procedure of No. **S9.11A** to the mobile-satellite service in the bands 1 530 – 1 544 MHz and 1 625.5 – 1 645.5 MHz, priority shall be given to accommodating the spectrum requirements for distress, urgency and safety communications of the Global Maritime Distress and Safety System (GMDSS). Maritime mobile-satellite distress, urgency and safety communications shall have priority access and immediate availability over all other mobile-satellite communications operating within a network (See also Resolution XXX (WRC-00)) Mobile-satellite systems shall not cause unacceptable interference to, or claim protection from, distress, urgency and safety communications of the GMDSS. Account shall be taken of the priority of safety-related communications in the other mobile-satellite services. ~~(See Resolution 218 (WRC-97)).~~

Reason: Resolution XXX is intended to replace Resolution **218**.

IAP/14/115
MOD

S5.357A In applying the procedures of No. **S9.11A** to the mobile-satellite service in the bands 1 545-1 555 MHz and 1 646.5-1 656.5 MHz, priority shall be given to accommodating the spectrum requirements of the aeronautical mobile-satellite (R) service providing transmission of messages with priority 1 to 6 in Article **S44**. Aeronautical mobile-satellite (R) service communications with priority 1 to 6 in Article **S44** shall have priority access and immediate availability, by pre-emption if necessary,

over all other mobile-satellite communications operating within a network. (See also Resolution XXX (WRC-00)) Mobile-satellite systems shall not cause unacceptable interference to, or claim protection from, aeronautical mobile-satellite (R) service communications with priority 1 to 6 in Article **S44**. Account shall be taken of the priority of safety-related communications in the other mobile-satellite services. ~~(See Resolution **218**)~~

Reason: Resolution XXX is intended to replace Resolution **218**.

~~**RESOLUTION 218 (WRC-97)**~~

IAP/14/116
SUP

~~**Use of the bands 1 525-1 559 MHz and 1 626.5-1 660.5 MHz by the mobile-satellite service**~~

Reason: Consequential to adding Resolution XXX.

IAP/14/117
ADD

RESOLUTION XXX (WRC-00)

Use of the bands 1 525-1 559 MHz and 1 626.5-1 660.5 MHz by the mobile-satellite service

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that the WRC-97 allocated the bands 1 525-1 559 MHz (space-to-Earth) and 1 626.5-1 660.5 MHz (Earth-to-space) to the mobile-satellite service (MSS) to facilitate the assignment of spectrum to multiple mobile-satellite systems in a flexible and efficient manner;

b) that prior to WRC-97 there was a generic allocation by footnote provisions in some countries for the use of the bands 1 530-1 544 MHz and 1 631.5-1 645.5 MHz by the MSS, on condition that maritime mobile-satellite distress and safety communications have priority access over all other communications;

c) that in the bands 1 525 – 1 559 MHz (space-to-Earth) and 1 626.5 – 1 660.5 MHz (Earth-to-space) allocated to the mobile-satellite service (MSS), footnotes **S5.353A**, and **S5.357A** give priority to the spectrum requirements for distress, urgency and safety communications of GMDSS and for transmission of messages with priority 1 to 6 of Article **S44** of AMS(R)S and provides protection to GMDSS and AMS(R)S from harmful interference by other mobile-satellite services;

d) that the results of the studies conducted by the ITU-R pursuant to WRC-97 Resolution **218** provide for spectrum estimates for the requirement of AMS(R)S traffic;

e) that the spectrum prioritization and pre-emption methods identified in the ITU-R studies can provide for the long term spectrum requirements of GMDSS and AMS(R)S;

f) that the technical standards which would provide for prioritization and real-time pre-emptive capabilities in future MSS systems in order to meet the long term requirements of GMDSS and AMS(R)S services need to be developed by the ITU-R;

g) that technical considerations for sharing satellite network resources between MSS (other than aeronautical mobile-satellite (R) service) and aeronautical mobile-

satellite (R) service have been developed by and are included in ITU-R Recommendation ITU-R M.1233;

h) that global and regional mobile-satellite systems are being multilaterally coordinated in the bands 1 525-1 559 MHz (space-to-Earth) and 1 626.5-1 660.5 MHz (Earth-to-space) and that the ITU Radio Regulations provide the international framework for multilateral agreements;

further considering

a) that the Convention on International Civil Aviation requires that stations of the aeronautical mobile-satellite (R) service shall be in compliance with the internationally agreed Standards and Recommended Practices and Procedures for Air Navigation Services;

b) that the ICAO has developed a global Air Traffic Management system which requires interoperability between stations operating in accordance with the ICAO Convention for those mobile-satellite systems providing aeronautical mobile-satellite (R) service communications with the priority message structure of Article **S44**;

c) that WRC-97 modified provisions for the operational use of the GMDSS which is fully defined in the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended (see MOD No. **S30.1**);

d) that in these bands GSO satellite system operators presently use a capacity planning approach at multi-lateral coordination meetings, with the guidance and support of their Administrations, to periodically coordinate access to the spectrum needed to accommodate their requirements, however, outside the multi-lateral process, coordination problems have occurred in some cases;

e) that in the bands to which RR Nos. **S5.353A** or **S5.357A** applies, the capacity planning approach, and other methods such as intra and inter-system prioritization, pre-emption and interoperability may assist to accommodate the expanding spectrum requirements of GMDSS and AMS(R)S;

f) that the feasibility of prioritization, real-time pre-emptive access and interoperability between different mobile-satellite systems and systems providing GMDSS and AMS(R)S has yet to be adequately determined;

recognizing

a) that Table S15-2 of Appendix **S15** identifies the bands 1 530-1 544 MHz (space-to-Earth) and 1 626.5-1 645.5 MHz (Earth-to-space) for distress and safety purposes in the maritime MSS as well as for routine non-safety purposes;

b) that the coordination process currently allows for the orderly development of MSS systems and applications while meeting the requirements for distress, urgency, and safety communications of GMDSS and for the transmission of messages with priority 1 to 6 of Article **S44** of AMS(R)S;

c) that in the future there may be a need for more flexible sharing methodologies to accommodate more systems and applications and that ITU-R has identified two possible sharing methodologies;

e) that such methodologies shall comply with the safety and regularity of flight requirements of ICAO and the safety at sea requirements of IMO.

resolves

that technical and operational standards be developed to allow prioritization and real-time pre-emptive access both within a single MSS system offering AMS(R)S communications, and between MSS systems which may or may not offer AMS(R)S communications;

requests ITU-R

to develop the technical standards which would enable the use of prioritization and real-time pre-emption, within a single system and pre-emption between MSS systems, in order to achieve the most flexible and practical use of the MSS allocation;

requests the next [competent] world radiocommunication conference

to take into account the outcome of ITU-R studies and take appropriate action on this subject,

invites

ICAO, IMO, IATA, and administrations concerned to participate in the studies identified in *requests ITU-R*.

Reason: This resolution calls for the ITU-R to study and develop the technical and operational requirements and specifications for intra-system and inter-system prioritization and pre-emption methods.

to review and, if appropriate, revise the power limits appearing in Articles S21 and S22 in relation to the sharing conditions among non-GSO FSS, GSO FSS, GSO broadcasting-satellite service (BSS), space sciences and terrestrial services, to ensure the feasibility of these power limits and that these limits do not impose undue constraints on the development of these systems and services;

Resolution 131 (WRC-97): Power Flux-Density limits applicable to non-GSO FSS systems for protection of terrestrial services in the bands 10.7 – 12.75 GHz and 17.7 – 19.3 GHz;

Submitted by the following Administrations:

[Antigua and Barbuda], [Bahamas], [Barbados], [Belize], [Bolivia], [Chile], [Costa Rica], [Dominica], [Dominican Republic], [El Salvador], [Grenada], [Guatemala], [Guyana], [Haiti], [Honduras], [Jamaica], [Nicaragua], [Panama], [Paraguay], [Peru], [Saint Lucia], [Saint Vincent and the Grenadines], [St. Kitts and Nevis], [Suriname], [Trinidad and Tobago], [Venezuela]

Argentina, Brazil, Canada, Colombia, Ecuador, Mexico, United States, Uruguay

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Background Information: WRC-97 provisionally adopted pfd limits to be applied to non-GSO FSS systems operating in these bands. In the 10.7 – 12.75 GHz band, WRC-97 applied the existing limits to both GSO and non-GSO systems, subject to further study by the ITU-R under Resolution **131** (WRC-97). In the 17.7 – 19.3 GHz, WRC-97 adopted more stringent pfd limits for non-GSO FSS systems with more than 100 satellites.

Many studies were performed in WP4-9S and by the JTG4-9-11 to determine the appropriate pfd limits to be applied to non-GSO FSS systems in the aforementioned bands. The intent was to find suitable pfd limits that would ensure protection of the fixed service without unduly constraining the development of either service.

At the most recent meeting of the JTG4-9-11, the experts present agreed to limits for both frequency bands.

In the 10.7 – 12.75 GHz range, the JTG concluded that the current limits in Article **S21** are sufficient to protect the FS on the basis of the assumptions used in the studies. The JTG also recommended the use of a 1-MHz reference bandwidth for non-GSO system. The conclusions of the JTG4-9-11 are summarized below.

The current RR Article **S21** per satellite pfd limits, as defined below and as discussed more fully in draft new Rec. ITU-T SF.[Doc. 4-9S/AI](Submitted to RA-2000 for approval), are adequate for the protection of the FS in the 10.7-12.75 GHz band from aggregate interference from three assumed non-homogeneous, non-GSO FSS systems. Moreover, the contribution of GSO interference to the sharing has been shown as not being significant. Studies support and validate this conclusion. These results would remain valid if the number of non-GSO FSS systems were in the range 3 to 5.

- in the 10.7-11.7 GHz band :

-126	dB(W/m^2) per 1 MHz	for $0° \le \delta < 5°$
-126+(δ-5)/2	dB(W/m^2) per 1 MHz	for $5° \le \delta < 25°$
-116	dB(W/m^2) per 1 MHz	for $25° \le \delta < 90°$

where δ is the angle of arrival above the horizontal plane.

- in the 11.7-12.75 GHz band :

-124	dB(W/m^2) per 1 MHz	for $0° \le \delta < 5°$
-124+(δ-5)/2	dB(W/m^2) per 1 MHz	for $5° \le \delta < 25°$
-114	dB(W/m^2) per 1 MHz	for $25° \le \delta < 90°$

where δ is the angle of arrival above the horizontal plane.

In the 17.7 – 19.3 GHz range, the conclusion of the JTG was that a tightening of the original Article S21 pfd limits for non-GSO FSS with large constellations (over 50 satellites) would ensure protection of the fixed service while not unduly constraining the development of non-GSO FSS systems. The JTG conclusion were:

The following per satellite pfd limits (also described in draft new Rec. ITU-R SF.[Doc. 4-9S/TEMP/94]) (Submitted to RA-2000 for approval) are adequate for the protection of the FS in the 17.7 – 19.3 GHz band from aggregate interference from three assumed non-homogeneous non-GSO FSS systems Moreover, the contribution of GSO interference to the sharing has been shown as not being significant. Studies support and validate this conclusion. These results would remain valid if the number of non-GSO FSS systems were in the range 3 to 5.

-115 - X	dB(W/m^2) per MHz	for $0° \le \delta < 5°$
-115 – X +((10 + X)/20)(δ-5)	dB(W/m^2) per MHz	for $5° \le \delta < 25°$
-105	dB(W/m^2) per MHz	for $25° \le \delta < 90°$

where δ is the angle of arrival above the horizontal plane and X is defined as a function of the number of satellites in the non-GSO FSS constellation, N, as follows:

– for $N \le 50$	$X = 0$	(dB)
– for $50 < N \le 288$	$X = \frac{5}{119}(N - 50)$	(dB)
– for $N > 288$	$X = \frac{1}{69}(N + 402)$	(dB)

The scaling function, X, was developed on the basis of non-GSO FSS constellations with 96, 288 and 840 satellites. Further simulations with different non-GSO FSS constellations comprising a wide range in the number of satellites (63, 126, 189, 252, and 504 satellites) and using the conservative pfd mask simulation method have confirmed the adequacy of this scaling function.

Further studies by some CITEL Administrations have shown that the interference levels obtained using the simple pfd mask methodologies used in the ITU-R studies are higher than those obtained using a more realistic modelling of the pfd entries. CITEL Administrations support the above pfd limits while noting that because of the operational characteristics of the non-GSO networks, interference margins will be present.

CITEL Objective: CITEL's objective is to ensure that the pfd limits in the bands 10.7 –12.75 GHz and 17.8 – 19.3 GHz will provide adequate protection of the terrestrial services while not unduly constraining the design of non-GSO FSS networks. Since the studies conducted in ITU-R indicate that both objectives have been achieved with the masks proposed by the JTG 4-9-11, these limits should be adopted in Article S21 of the Radio Regulations.

Proposal(s):

1. It is proposed to retain the current **S21** PFD limits in the 10.7-12.75 GHz range, but scaling to a 1-MHz reference bandwidth for non-GSO systems and remove references to further studies.
2. It is proposed to adopt the compromise **S21** PFD limits in the 17.7-19.3 GHz band agreed to by the JTG4-9-11 and remove references to further studies.
3. As a consequence, it is proposed to delete Resolution **131** (WRC-97)
4. Changes in the frequency band column referring to S5.494 and S5.496 is required because the FS is allocated in all countries of Region 3.

IAP/14/118

MOD

TABLE **S21-4** *(continued)*

Note: Only the portions of the table that were change were reproduced.

Frequency band	**Service***	**Limit in dB(W/m^2) for angle of arrival (δ) above the horizontal plane**			**Reference bandwidth**
		0°-5°	**5°-25°**	**25°-90°**	
10.7-11.7 GHz	Fixed-satellite (space-to-Earth), geostationary-satellite orbit	~~–150~~ ~~14~~	~~–150 + 0.5(δ – 5)~~ ~~14~~	~~–140~~ ~~14~~	4 kHz
10.7 – 11.7 GHz	Fixed-satellite (space-to-Earth), non-geostationary-satellite orbit	-126	-126 + 0.5(δ – 5)	-116	1MHz
11.7-12.5 GHz (Region 1) 12.5 – 12.75 GHz (Region 1 countries listed in Nos. **S5.494** and **S5.496**) 11.7-12.~~2~~7 GHz (Region 2) 11.7-12.~~2~~75 GHz (Region 3) ~~12.2-12.7 GHz (Region 2)~~	Fixed-satellite (space-to-Earth), non-geostationary-satellite orbit	~~-148~~ ~~15~~ -124	~~-148 + 0.5(δ – 5)~~ ~~15~~ -124 + 0.5(δ – 5)	~~-138~~ ~~15~~ -114	~~4 kHz~~ 1MHz

12.2-12.~~5~~75 GHz[7] (Region 3) 12.5-12.75 GHz[7] (Region 1 ~~and Region 3~~ countries listed in Nos. **S5.494** and **S5.496**)	Fixed-satellite (space-to-Earth), geostationary-satellite orbit	–148 [14]	–148 + 0.5(δ – 5)[14]	–138 [14]	4 kHz
17.7-19.3 GHz[7, 8]	Fixed-satellite (space-to-Earth) Meteorological-satellite (space-to-Earth)	–115[aa] or ~~–125~~ -115 – X [12]	–115 + 0.5(δ – 5)[aa] or ~~–125 + (δ – 5)~~ -115 – X + ((10 + X)/20) (δ – 5) [12]	–105[aa] or –105 [12]	1 MHz

IAP/14/119

ADD

[aa] **S21.16.6bis.** These limits apply to emissions of a space station on a meteorological-satellite and on a geostationary FSS satellite. These limits also apply to emissions of a space station on a non-geostationary FSS satellite in the band 18.8-19.3 GHz for which complete coordination or notification information has been received by the Radiocommunication Bureau by 17 November 1995, or are in operation by that date (WRC-00).

Reason: the above regulatory text (as contained in the CPM Report) reflects the date-specific provisions currently in Resolution 131.

IAP/14/120

MOD

[12] **S21.16.6** ~~These values shall apply provisionally only to emissions of space stations on non-geostationary satellites in networks operating with a large number of satellites, that is systems operating with more than 100 satellites (see Resolution **131 (WRC-97)**). (WRC-97)~~ The function X is defined as a function of the number, N, of satellites in the non-GSO FSS constellation as follows:

– for $N \leq 50$ $X = 0$ (dB)

– for $50 < N \leq 288$ $X = \frac{5}{119}(N - 50)$ (dB)

– for $N > 288$ $X = \frac{1}{69}(N + 402)$ (dB)

In the band 18.8-19.3 GHz, these limits apply to emissions of a space station on a non-geostationary FSS satellite for which complete coordination or notification information, as appropriate, has been received by the Radiocommunication Bureau after 17 November 1995, and which were not operational by that date. (WRC-00)

Reason: The above regulatory text (as contained in the CPM Report) maintains the original limits for non-GSO FSS systems in the band 18.8-19.3 GHz that were notified or operational prior to the end of WRC-95 per the decisions in Resolution 131 (WRC-97). In the band 17.7-18.8 GHz, the new limits would apply to all non-GSO systems irrespective of the date of receipt of information or date of bringing into operation

IAP/14/121

SUP

[14] **S21.16.8** ~~Although these limits apply to both geostationary and non-geostationary satellites in the fixed-satellite service, values for non-geostationary-satellite systems require further study (see Resolution **131** (WRC-97)). (WRC-97)~~

IAP/14/122

SUP

[15] **S21.16.9** ~~These values require further study (see Resolution **131 (WRC-97)**). (WRC-97)~~

IAP/14/123

SUP

~~RESOLUTION **131 (WRC-97)**~~

~~**Power flux-density limits applicable to non-geostationary fixed-satellite service systems for protection of terrestrial services in the bands 10.7-12.75 GHz and 17.7-19.3 GHz**~~

Reason: Replaces the provisional pfd limits in Table **S21-4** with the values that, as a result of extensive ITU-R studies, were agreed by WP 4-9S and JTG 4-9-11. **ADD**[aa] **S21.16.6bis,** and a corresponding change in **MOD**[12] **S21.16.6,** specify the dates of application of the pfd limits in conformance with the dates established in **RES131**. Footnotes **S21.16.8**, **S21.16.9**, and **RES131** are no longer required.

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to consider the inclusion in other frequency bands of similar limits in Articles S21 and S22, or other regulatory approaches to be applied in relation to sharing situations;

Proposals submitted by the following Administrations:

[Antigua and Barbuda], [Bahamas], [Barbados], [Belize], [Bolivia], [Chile], [Costa Rica], [Dominica], [Dominican Republic], [El Salvador], [Grenada], [Guatemala], [Guyana], [Haiti], [Honduras], [Jamaica], [Nicaragua], [Panama], [Paraguay], [Peru], [Saint Lucia], [Saint Vincent and the Grenadines], [St. Kitts and Nevis], [Suriname], [Trinidad and Tobago], [Venezuela]

Argentina,, Brazil, Canada, Colombia, Ecuador, Mexico, United States, Uruguay

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Proposal(s):

IAP/14/124

There have been no technical studies carried out in frequency bands other than those considered under Agenda Item 1.13.1. Consequently, there should not be any limits adopted in Article **S22** for frequency bands other than those identified in Resolutions **130** (WRC-97) and **538** (WRC-97) per Agenda Item 1.13.1.

WRC-2000 Agenda item 1.15.1

to consider new allocations to the radionavigation-satellite service in the range from 1 GHz to 6 GHz required to support developments

Proposal for RNSS allocation (space-to-Earth) in the upper part of the band 960-1215 MHz

Submitted by the following Administrations:

[Antigua and Barbuda], [Bahamas], [Barbados], [Belize], [Brazil], [Dominica], [Dominican Republic], [Ecuador] [El Salvador], [Grenada], [Guatemala], [Guyana], [Haiti], [Honduras], [Jamaica], [Nicaragua], [Panama], [Paraguay], [Peru], [Saint Lucia], [Saint Vincent and the Grenadines], [St. Kitts and Nevis], [Suriname], [Trinidad and Tobago], [Venezuela]

Argentina, Bolivia, Canada, Chile, Colombia, Costa Rica, Mexico, United States, Uruguay

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Background Information: Additional Radionavigation-Satellite Service (RNSS) signals will greatly enhance the accuracy, reliability and robustness of the civil Global Positioning System (GPS) by enabling more effective corrections to be made for the time delay effects of the ionosphere on the signals from space. The International Civil Aviation Organization (ICAO) has stated the requirement for an additional civil signal to support Global Navigation Satellite System (GNSS) requirements and for space-based augmentation systems. A requirement for aeronautical users is to have the protected signal operate within radio spectrum allocated to the Aeronautical Radionavigation Service (ARNS), which would also include the possibility of terrestrial augmentation systems.

However, studies show that airborne RNSS receivers at altitudes of 10,000 ft and above may not be compatible with the existing environment in certain geographic areas. The band 1151-1215 MHz has been identified to accommodate additional spectrum for an international civil aviation safety-of-life service. The DME/TACAN constitutes the primary source of interference but because of its importance to civil aviation navigation, it must be protected for continued use for the foreseeable future. Recoordination of some DME/TACAN could be considered, if required, in order for GPS to be used in North America for civil aviation safety-of-life services.

Sharing of the same spectrum by two or three different RNSS networks would require compatible power levels and signal types in the design and operation of the different networks. Use of independent spectrum by each RNSS network would decrease the chance of a single interference incident affecting more than one network. Therefore, the allocation should accommodate the spectrum requirement of two or three different RNSS systems.

CITEL supports a new allocation to RNSS in the band 1151–1215 MHz with appropriate regulatory measures to protect the current use and the development of airborne electronic aids to air navigation and any directly associated ground-based facilities.

CITEL Members States recognize that discussions continue regarding the total amount of spectrum required to support several RNSS systems.

Proposal(s):

IAP/14/125
MOD

Table of Frequency Allocations
MHz
960-1 215 MHz

Allocation to services		
Region 1	Region 2	Region 3
960-1 215	AERONAUTICAL RADIONAVIGATION **MOD** S5.328	

IAP/14/126
MOD

S5.328 The band 960-1215 MHz is reserved on a worldwide basis for the use and development of airborne electronic aids to air navigation and any directly associated ground-based and satellite-borne (1164-1212 MHz only) facilities. The band 1164 – 1 212 MHz is also allocated to the Radionavigation Satellite Service (space to Earth) on a primary basis. Stations of the Radionavigation Satellite Service shall not cause harmful interference to nor claim protection from stations of the Aeronautical Radionavigation Service.

Reason: Radionavigation Satellite Service systems will be provided with adequate spectrum while giving priority to the Aeronautical Radionavigation Service.

WRC-2000 Agenda item 1.15.1

to consider new allocations to the radionavigation-satellite service in the range from 1 GHz to 6 GHz required to support developments

Proposal for RNSS allocation (space-to-Earth) in the upper part of the band 1260-1300 MHz

Submitted by the following Administrations:

[Antigua and Barbuda], [Argentina], [Bahamas], [Barbados], [Belize], [Brazil], [Dominica], [Dominican Republic], [Ecuador] [El Salvador], [Grenada], [Guatemala], [Guyana], [Haiti], [Honduras], [Jamaica], [Nicaragua], [Panama], [Paraguay], [Peru], [Saint Lucia], [Saint Vincent and the Grenadines], [St. Kitts and Nevis], [Suriname], [Trinidad and Tobago], [United States], [Venezuela]

Bolivia, Canada, Chile, Colombia, Costa Rica, Mexico, Uruguay

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Background Information: The band 1 260 – 1 300 MHz is allocated on a primary basis to the Radiolocation, to the Earth Exploration-Satellite (active) and to the Space Research (active) services. Domestic footnotes allocate this band on a primary basis in several countries to the fixed and mobile services and to the radionavigation service. In Canada and the United-States, the band 1240-1300 MHz is also allocated to the aeronautical radionavigation service on a primary basis. The band 1260-1300 MHz is also allocated to the Amateur service on a secondary basis.

Footnote S5.282 allows the use of the Amateur-satellite service (Earth-to-space) on a non-protection no-interference basis with respect to other services operating in this band in accordance with the table (see S5.43). The usage of this band by the amateur satellite service is expected to increase.

Similar to the band 1215-1260 MHz, the band 1260-1300 MHz is used by radars. Furthermore, this band is used for high power wind profiler radars. It is not suitable for safety of life applications, similarly to the RNSS usage in the band 1215 to 1260 MHz.

CITEL supports a new allocation in the band 1260 – 1300 MHz, (s-E) for RNSS non-safety-of-life applications.

CITEL Members States recognize that discussions continue regarding the total amount of spectrum required to support several RNSS systems.

Proposal:

IAP/14/127
MOD

1260-1300 MHz

Allocation to services		
Region 1	Region 2	Region 3
1 260-1 300	RADIOLOCATION EARTH EXPLORATION-SATELLITE (active) SPACE RESEARCH (active) RADIONAVIGATION SATELLITE (space to Earth) **ADD** S5.329A Amateur S5.282, S5.330, S5.331, S5.332, S5.334, S5.335	

IAP/14/128
ADD

S5.329A Use of the radionavigation satellite service in the band 1260-1300 MHz shall be subject to the condition that no harmful interference is caused to and no protection is claimed from the radionavigation service authorised under S5.331.

Reason: RNSS will be provided with adequate spectrum for non safety of life applications while safeguarding the development and protection of the Radionavigation Services.

WRC-2000 Agenda item 1.15.1

to consider new allocations to the radionavigation-satellite service in the range from 1 GHz to 6 GHz required to support developments

Proposal for RNSS (Earth-to-space) 5000 to 5010 MHz and (space-to-Earth) 5010-5030 MHz

Submitted by the following Administrations:

[Antigua and Barbuda], [Bahamas], [Barbados], [Belize], [Brazil], [Dominica], [Dominican Republic], [Ecuador] [El Salvador], [Grenada], [Guatemala], [Guyana], [Haiti], [Honduras], [Jamaica], [Nicaragua], [Panama], [Paraguay], [Peru], [Saint Lucia], [Saint Vincent and the Grenadines], [St. Kitts and Nevis], [Suriname], [Trinidad and Tobago], [United States], [Venezuela]

Argentina, Bolivia, Canada, Chile, Colombia, Costa Rica, Mexico, Uruguay

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Background Information: In accordance with the ITU RR, the band 5000-5250 MHz is allocated on a primary basis to the aeronautical radionavigation service in all three ITU regions. The band 5000–5030 MHz is not used nor intended to be used for the international standard MLS system.

Results of ITU-R studies show that with the 10 MHz of separation and the use of adequate and existing filter technology by the RNSS, the protection requirements of the RAS as contained in Rec. ITU-R RA 769-1 are met.

The use of RNSS (space-to-Earth) is compatible with the MLS operations in the band 5030 – 5150 MHz if the pfd at the surface of the Earth does not exceed –124.5 dB(W/m^2), in a 150 kHz band, as specified by ICAO. The use of RNSS (Earth-to-space) is compatible with the MLS operations through careful location of the radiobeacons.

The usage of the band 5 010 – 5030 MHz by RNSS (space-to-Earth) and (Earth-to-space) are mutually exclusive. If the allocation to the RNSS (space-to-Earth) in the band 5 010 to 5 030 MHz is not implemented, then the allocation to the RNSS (Earth-to-space) could be extended to the band 5 030 MHz.

CITEL supports the allocation to RNSS in the band 5 010 - 5030 MHz (space to Earth), and the allocation to RNSS in the band 5 000 - 5010 MHz (Earth to space).

Proposal:

IAP/14/129
MOD

5 000-5 030 MHz

Allocation to services		
Region 1	Region 2	Region 3
5 000-5 150	AERONAUTICAL RADIONAVIGATION S5.367 **MOD** S5.444 S5.444A **ADD** S5.444B	

IAP/14/130
MOD

S5.444 The band ~~5000~~5030 – 5150 MHz is to be used for the operation of the international standard system (microwave landing system) for precision approach and landing. The requirements of this system shall take precedence over other uses of this band. For the use of this band, see No. S5.444A and Resolution 114 (WRC-~~95~~2000) ~~apply~~.

Reason: To indicate that the 5000-5030 MHz is no longer intended to be used for MLS.

IAP/14/131
ADD

S5.444B Additional allocation: The band 5 010 – 5 030 MHz is also allocated to the radionavigation-satellite service (space-to-Earth) on a primary basis. The band 5 000 – 5 010 MHz is also allocated to the Radionavigation Satellite Service (Earth–to–space on a primary basis. Harmful interference shall not be caused to stations of the Radioastronomy Service using the band 4 990 – 5 000 MHz by stations of the Radionavigation satellite service (see No. S29.13).

Reason: To enable RNSS uplink and downlink operations while protecting radio astronomy observations.

WRC-2000 Agenda item 1.15.1

to consider new allocations to the radionavigation-satellite service in the range from 1 GHz to 6 GHz required to support developments

Proposal for RNSS (Earth-to-space) in the band 1300–1350 MHz

Submitted by the following Administrations:

[Antigua and Barbuda], [Bahamas], [Barbados], [Belize], [Brazil], [Dominica], [Dominican Republic], [Ecuador] [El Salvador], [Grenada], [Guatemala], [Guyana], [Haiti], [Honduras], [Jamaica], [Nicaragua], [Panama], [Paraguay], [Peru], [Saint Lucia], [Saint Vincent and the Grenadines], [St. Kitts and Nevis], [Suriname], [Trinidad and Tobago], [United States], [Venezuela]

Argentina, Bolivia, Canada, Chile, Colombia, Costa Rica, Mexico, Uruguay

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Background Information: The band 1300–1350 MHz is allocated worldwide on a primary basis to the aeronautical radionavigation service and on a secondary basis to the radiolocation service. New allocations for RNSS are required to support developments and some proposed RNSS systems would require a limited number of terrestrial radio beacons for synchronization. Footnote S5.149 indicates spectral line observations by the Radioastronomy service and that precautions should be taken to protect the RA service from harmful interference.

Careful location of the radiobeacons should protect the RA astronomy service.

Results of ITU-R studies show that the required separation distance between radars and terrestrial beacons would be less than 60 km to protect the radars.

By making the Radiolocation allocation primary, equal status would be given to both the RNSS (Earth to space) and the Radiolocation radars, which would need to be coordinated. A footnote would preserve the higher status of the Aeronautical radionavigation service.

Proposal(s):

CITEL supports the allocation to RNSS (Earth to space) in the band 1 300 – 1 350 MHz.

IAP/14/132
MOD

1 300-1 350 MHz

Allocation to services		
Region 1	Region 2	Region 3
1 300-1 350	AERONAUTICAL RADIONAVIGATION S5.337 RADIONAVIGATION SATELLITE (Earth to space) MOD S5.337A RADIOLOCATION ~~Radiolocation~~ **ADD** S5.337A S5.149	

IAP/14/133
ADD

S5.337A The use of the band 1 300 – 1 350 MHz by the Radionavigation satellite service Earth stations and stations of the radiolocation service shall not cause harmful interference to nor constrain the development of the aeronautical radionavigation service.

Reason: To enable use of the band for RNSS uplinks, while protecting other aeronautical radionavigation services.

WRC-2000 Agenda Item 1.15.2

to consider the addition of the space-to-space direction to the radionavigation-satellite service allocations in the bands 1 215 -1 260 and 1 559 - 1610 MHz

Submitted by the following Administrations:

[Antigua and Barbuda], [Bahamas], [Barbados], [Belize], [Bolivia], [Brazil], [Chile], [Dominica], [Dominican Republic], [Grenada], [Guatemala], [Guyana], [Haiti], [Honduras], [Jamaica], [Nicaragua], [Panama], [Paraguay], [Peru], [Saint Lucia], [Saint Vincent and the Grenadines], [St. Kitts and Nevis], [Suriname], [Trinidad and Tobago]

Argentina, Canada, Colombia, Costa Rica, Ecuador, El Salvador, Mexico, United States, Uruguay, Venezuela

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Background Information: Radionavigation-Satellite Service (RNSS) systems such as the Global Positioning System and Global Navigation Satellite System are primarily being used in the space-to-Earth direction to provide service to terrestrial users. These systems are, however, also increasingly being used in the space-to-space direction by spaceborne users for such applications as spacecraft three-dimensional positioning and velocity determination; three-axis attitude control; precise time synchronization; precision orbit determination, and atmospheric science. The use of RNSS signals is presently protected only through a space-to-Earth allocation in the 1 215 - 1 260 and 1 559 - 1 610 MHz bands. Recognizing current and future operational usage of spaceborne RNSS receivers for scientific and commercial applications, it is important to add the space-to-space direction to the existing RNSS allocations so that these uses can be taken into consideration when changes to the use of these bands are contemplated.

Interference studies have been conducted to assess the sensitivity of spaceborne RNSS receivers to interference from radiolocation, Earth exploration-satellite (active), space research (active), fixed, mobile and aeronautical radionavigation services in the 1 215 - 1 260 MHz band; from the aeronautical radionavigation and fixed services in the 1 559 - 1 610 MHz band; and also their sensitivity to intra-service interference between radionavigation satellite service systems in these two bands.

The ITU-R has concluded that the addition of a space-to-space direction to the 1 215 - 1 260 MHz and 1 559 - 1 610 MHz RNSS bands will not cause any additional interference to other services since it involves no change to the space-to-Earth transmissions.

Studies demonstrate that RNSS spaceborne receivers can operate satisfactorily in the presence of interference caused by systems in other services as well as other RNSS systems. Potential interference from services in adjacent bands was also examined.

Existing coordination procedures are adequate for space-to-space operations and no additional protection will be required.

Proposal(s):

IAP/14/134

MOD

MHz
1 215 – 1 260

Allocation to Services		
Region 1	Region 2	Region 3
1 215-1 240	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) SPACE RESEARCH (active) S5.329 S5.330 S5.331 S5.332	
1 240-1 260	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) SPACE RESEARCH (active) Amateur S5.329 S5.330 S5.331 S5.332 S5.334 S5.335	

Reason: Provide an allocation for space-to-space use for RNSS, which will ensure the protection of space-based RNSS receivers.

IAP/14/135

MOD

MHz
1 559 – 1 610

Allocation to Services		
Region 1	Region 2	Region 3
1 559 – 1 610		
	AERONAUTICAL RADIONAVIGATION	
	RADIONAVIGATION-SATELLITE (space-to-Earth)	
	(space-to-space)	
	S5.341 S5.355 S5.359 S5.363	

Reason: Provide an allocation for space-to-space use for RNSS, which will ensure the protection of space-based RNSS receivers.

WRC-2000 Agenda Item 1.16

to consider allocations of frequency bands above 71 GHz to the earth-exploration satellite (passive) and radio astronomy services, taking into account Resolution 723

Proposal to modify the allocations above 71 GHz

Submitted by the following Administrations:

[Antigua and Barbuda], [Bahamas], [Barbados], [Belize], [Dominica], [Dominican Republic], [Grenada], [Guyana], [Haiti], [Honduras], [Jamaica], [Nicaragua], [Panama], [Peru], [Saint Lucia], [Saint Vincent and the Grenadines], [St. Kitts and Nevis], [Suriname], [Trinidad and Tobago], [Venezuela]

Argentina, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Mexico, Paraguay, United States, Uruguay

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Background Information: The following proposals modify many of the allocation tables above 71 GHz to accommodate the requirements of the radio astronomy and earth-exploration satellite (passive) services, while giving consideration to the needs of other services. The modifications to the allocation tables maintain the aggregate amount of spectrum allocated to the displaced services (including the fixed-satellite service), provide frequency blocks 5-9 GHz wide to accommodate future wideband multimedia systems while taking into account differences in atmospheric attenuation, and provide appropriate separation between services.

Resolutions XXX and YYY address the need for future study between co-allocated active services and between active and passive services at such a time when the technical characteristics of the active services become known.

Proposal(s):

GHz

71 – 74

Allocation to Services		
Region 1	Region 2	Region 3
71 – 74	FIXED FIXED-SATELLITE ~~(Earth-to-space)~~ (space-to-Earth) MOBILE MOBILE-SATELLITE ~~(Earth-to-space)~~ (space-to-Earth) ~~S5.149 S5.556~~	

IAP/14/ 136
MOD

Reason: MSS and FSS uplinks and downlinks in 71-74 GHz and 81-84 GHz bands have been interchanged to avoid satellite downlinks in bands needed by RAS. Atmospheric absorption is only slightly higher in 71-74 GHz band than in 81-84 GHz band. The RAS footnotes **S5.149** and **S5.556** have been deleted in favor of allocations above 76 GHz. The reference to the 72.77-72.91 GHz band in footnotes **S5.149** and **S5.556** has been deleted.

GHz

74 – 76

Allocation to Services		
Region 1	Region 2	Region 3
74 – 75.5		
	BROADCASTING-SATELLITE	
	FIXED	
	~~FIXED-SATELLITE (Earth-to-space)~~	
	FIXED-SATELLITE (space-to-Earth)	
	MOBILE	
	Space Research (space-to-Earth)	
	MOD S5.561	
75.5 – 76		
	~~AMATEUR~~	
	~~AMATEUR-SATELLITE~~	
	BROADCASTING-SATELLITE	
	FIXED	
	FIXED-SATELLITE (space-to-Earth)	
	MOBILE	
	Space Research (space-to-Earth)	
	MOD S5.561 **ADD** S5.EEE	

IAP/14/ 137
MOD

IAP/14/ 138
MOD

Reason: BSS, which is currently allocated to the 84-86 GHz band, has been relocated to this band to protect RAS above 76 GHz. Atmospheric absorption is only slightly higher in 74-76 GHz band than in 84-86 GHz band. Amateur and Amateur-Satellite allocations have been shifted to 80.5-81 GHz. The new footnote **S5.EEE** protects existing Amateur and Amateur-Satellite operations in the 75.5-76 GHz band until the year 200[X]. The FSS (Earth-to-space) allocation has been moved to 84-86 GHz band. The proposed allocations in the 74-84 GHz range preserve a contiguous 10 GHz space research downlink (secondary), which is required for space VLBI purposes. The footnote **S5.561** has been modified to recognize the change in BSS allocation.

GHz

76 – 81

	Allocation to Services		
	Region 1	Region 2	Region 3
IAP/14/ 139 **MOD**	**76 – ~~81~~77.5**	RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-Satellite Space Research (space-to-Earth) ~~S5.560~~ **MOD** S5.149	
IAP/14/ 140 **MOD**	**77.5 – 78**	AMATEUR AMATEUR SATELLITE ~~RADIOLOCATION~~ ~~Amateur~~ ~~Amateur-Satellite~~ Radio Astronomy Space Research (space-to-Earth) ~~S5.560~~ **MOD** S5.149	
IAP/14/ 141 **MOD**	**78 – 81**	RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-Satellite Space Research (space-to-Earth) S5.560 **MOD** S5.149	

Reason: The existing 76 - 81 GHz band has been divided into three sub-bands. The addition of a radio astronomy allocation and **RES RAS** satisfies the requirements for radio astronomy spectral line and wide band continuum observations from remote locations world-wide in both the 76 - 77.5 GHz and 78 – 81 GHz bands. Radio astronomy is added as a secondary allocation in the 77.5 – 78 GHz band. Amateur and amateur-satellite services are shifted by 0.5 GHz, to accommodate BS, FSS and MSS downlinks at the lower portion of atmospheric window, and to avoid sharing with vehicular radars, which some Administrations have authorized to operate in the 76-77 GHz band. There is no change in sharing between services, except for introduction of RAS allocation in the upper and lower sub-bands. These bands have been added to those listed under **S5.149**. The footnote **S5.560** is deleted from the 76 - 77.5 and 77 - 78 GHz sub-bands, where it doesn't apply.

GHz

81 – 84

IAP/14/ 142
MOD

Allocation to Services		
Region 1	Region 2	Region 3
81 – 84	FIXED ~~FIXED-SATELLITE (space-to-Earth)~~ FIXED-SATELLITE (Earth-to-space) MOBILE ~~MOBILE-SATELLITE (space-to-Earth)~~ MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY Space research (space-to-Earth) **MOD** S5.149 S5.DDD	

Reason: The directions of MSS and FSS downlinks have been reversed to allow radio astronomy observations. The uplinks are paired with the 71-74 GHz downlinks. The addition of a radio astronomy allocation and **RES RAS** satisfies the requirements for radio astronomy spectral line and wide band continuum observations from remote locations worldwide. The footnote **S5.DDD** has been added to maintain the current amount of secondary amateur and amateur-satellite spectrum. This band has been added to footnote **S5.149**.

GHz

84 – 86

IAP/14/ 143
MOD

Allocation to Services		
Region 1	Region 2	Region 3
84 – 86	BROADCASTING ~~BROADCASTING-SATELLITE~~ FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY **MOD** S5.149 ~~S5.561~~	

Reason: The Broadcasting Satellite allocation has been relocated to 74-76 GHz band. The direction of satellite downlinks has been reversed to allow radio astronomy observations. The uplink has been paired with 74-76 GHz downlink. The addition of a

radio astronomy allocation and **RES RAS** satisfies the requirements for radio astronomy spectral line and wide band continuum observations from remote locations worldwide. This band has been added to footnote **S5.149**. The **S5.561** footnote is no longer relevant to this band; appropriately modified it now applies to the 74-75.5 GHz and 75.5 - 76 GHz bands.

GHz

86 – 92

Allocation to Services		
Region 1	Region 2	Region 3
86 – 92	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) **MOD** S5.340	

IAP/14/144
NOC

Reason: This band is of crucial importance to the RAS, SR (passive) and EES (passive) services; it is the window for the band around 118.75 GHz. No active services are acceptable in this band and no change in current allocations is feasible.

GHz

92 – 94

Allocation to Services		
Region 1	Region 2	Region 3
92 – 94	FIXED ~~FIXED-SATELLITE (Earth-to-space)~~ MOBILE RADIO ASTRONOMY RADIOLOCATION **MOD** S5.149 ~~S5.556~~	

IAP/14/ 145
MOD

Reason: The addition of a radio astronomy allocation and **RES RAS** satisfies the requirements for radio astronomy spectral line and wide band continuum observations from remote locations world-wide. Previously, radio astronomy interest was recognised via footnote **S5.556**. The FSS (Earth-to-space) allocation, no longer needed to balance 102-105 GHz allocation, has been relocated to 71-76 GHz band. This band has been added to those listed under **S5.149**. Footnote **S5.556** has been deleted from this band, as it is no longer necessary.

GHz

94 – 94.1

Allocation to Services		
Region 1	Region 2	Region 3
94 – 94.1	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) Radio Astronomy S5.562	

IAP/14/ 146
MOD

Reason: The radio astronomy service is secondary to the active services. No change in sharing between services is proposed, except for introduction of the RAS allocation in this band.

GHz

94.1 – 95

Allocation to Services		
Region 1	Region 2	Region 3
94.1 – 95	FIXED ~~FIXED-SATELLITE (Earth-to-space)~~ MOBILE RADIO ASTRONOMY RADIOLOCATION **MOD** S5.149 ~~S5.556~~	

IAP/14/ 147
MOD

Reason: The addition of a radio astronomy allocation and **RES RAS** satisfies the requirements for radio astronomy spectral line and wide band continuum observations from remote locations world-wide. No change in sharing between existing services, except for introduction of RAS allocation in band. The FSS (Earth-to-space) allocation, no longer needed to balance 102-105 GHz, has been relocated to 71-76 GHz band. The footnote **S5.556** is deleted, as it is not relevant to this band (should have been suppressed consequential to WRC-97 actions). This band has been added to those listed under **S5.149**.

GHz

95 – 100

Allocation to Services		
Region 1	Region 2	Region 3
95 – 100	FIXED **MOD** S5.553 MOBILE **MOD** S5.553 ~~MOBILE-SATELLITE~~ RADIO ASTRONOMY RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE ~~Radiolocation~~ **MOD** S5.149 **MOD** S5.554 ~~S5.555~~	

IAP/14/148
MOD

Reason: The addition of a radio astronomy allocation and **RES RAS** satisfies the requirements for radio astronomy spectral line and wide band continuum observations from remote locations world-wide. Radiolocation has been upgraded to primary, consequential to the addition of radio astronomy as a primary service. The mobile satellite service is deleted, as it cannot share with the Radiolocation service. This band has been added to those listed under **S5.149**. Footnote **S5.555**, which allocates the 97.88-98.08 GHz sub-band to the RAS on a primary basis has been deleted, and the band has been deleted from footnote **S5.555**. The footnote **S5.553** has been modified to include stations in the fixed service.

GHz

100 – 102

Allocation to Services		
Region 1	Region 2	Region 3
100 – 102	EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) **MOD** S5.149 S5.341	

IAP/14/ 149
MOD

Reason: The addition of a radio astronomy allocation and **RES RAS** satisfies the requirements for radio astronomy spectral line and wide band continuum observations from remote locations world-wide. There is no change in sharing between services, except for introduction of RAS allocation in band. This band is used by EES (passive) for limb sounding of atmospheric constituents (NO line at 100.49 GHz). This band added to those listed under **S5.149**.

GHz

102 – 105

Allocation to Services		
Region 1	Region 2	Region 3
102 – 105	FIXED ~~FIXED-SATELLITE (space-to-Earth)~~ MOBILE RADIO ASTRONOMY **MOD** S5.149 S5.341	

IAP/14/ 150
MOD

Reason: The FSS allocation has been moved to 74-76 GHz band, to eliminate downlinks in the middle of the atmospheric window needed for radio astronomy observations. Atmospheric absorption in these two windows is similar. The addition of a radio astronomy allocation and **RES RAS** satisfies the requirements for radio astronomy spectral line and wide band continuum observations from remote locations world-wide. This band has been added to those listed under **S5.149.**

GHz

105 – 109.5

Allocation to Services		
Region 1	Region 2	Region 3
105 – ~~116~~109.5	~~EARTH EXPLORATION-SATELLITE (passive)~~ FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.CCC **MOD** S5.149 ~~S5.340~~ S5.341	

IAP/14/ 151
MOD

Reason: The 105-116 GHz range has been divided into 4 sub-bands to make additional spectrum available for other services and to adjust other passive allocations to areas of the spectrum that are more appropriate to meet scientific needs. Passive sensors have no known use for, and do not need the band 105-109.5 GHz, so they have been deleted. Fixed and mobile services have been added, relocated from 116 - 122.5 GHz band, where deletion of these services is needed to protect essential passive sensor operations. Since this band is no longer passive in nature, footnote **S5.340** should be deleted. This band is added to those included under S5.149, to reflect the need to protect radio astronomy in a band that is no longer passive. Footnote **S5.CCC** is added to limit Space Research (passive) allocation to space-based radio astronomy in this band.

GHz

109.5 – 111.8 GHz

Allocation to Services		
Region 1	Region 2	Region 3
<u>109.5 – 111.8</u>	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) **MOD** S5.340 S5.341	

IAP/14/ 152
MOD

Reason: It is essential to maintain this passive band. The **MOD** refers to the band limits only; no change **<u>(NOC)</u>** is proposed to the allocations within this sub-band. This band contains an ozone line at 110.8 GHz, which is used for microwave limb sounding. The entire band is of vital importance to radio astronomy for observations of the CO lines at 109.8 and 110.2 GHz, and continuum observations.

GHz

111.8 – 114.25 GHz

Allocation to Services		
Region 1	Region 2	Region 3
<u>111.8 – 114.25</u>	~~EARTH EXPLORATION-SATELLITE (passive)~~ <u>FIXED</u> <u>MOBILE</u> RADIO ASTRONOMY SPACE RESEARCH (passive) <u>S5.CCC</u> <u>**MOD** S5.149 ~~S5.340~~</u> S5.341	

IAP/14/ 153
MOD

Reason: Passive sensors do not need the band 111.8-114.25 GHz and have been deleted. Fixed and mobile services are added to this band, they were relocated from the 116 - 122.5 GHz band where deletion of these services is needed to protect essential passive sensor operations. This band is added to those included under **S5.149** to reflect the need to protect radio astronomy in a band that is no longer passive. The addition of the new footnote **S5.CCC** limits the Space Research (passive) allocation to space-based radio astronomy in this band.

GHz

114.25 -- 116 GHz

Allocation to Services		
Region 1	Region 2	Region 3
<u>114.25</u> – 116	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) **MOD** S5.340 S5.341	

IAP/14/ 154
MOD

Reason: It is essential to maintain this passive band. The **MOD** refers to the band limits only; no change **<u>(NOC)</u>** is proposed to the allocations within this sub-band. The band 114.25-116 GHz is of vital importance to radio astronomy for observations of the 115.3 GHz CO line and is the first portion of the 114.25-122.25 GHz oxygen absorption band which is required for remote sensing, with a peak at 118.75 GHz.

GHz

116 – 122.25

	Allocation to Services		
	Region 1	Region 2	Region 3
IAP/14/ 155 **MOD**	**116 – 119.98**	EARTH EXPLORATION-SATELLITE (passive) ~~FIXED~~ INTER-SATELLITE **ADD** S5.XXX ~~MOBILE~~ ~~S5.558~~ SPACE RESEARCH (passive) ~~S5.138~~ S5.341	
IAP/14/ 156 **MOD**	**119.98 – 120.02**	EARTH EXPLORATION-SATELLITE (passive) ~~FIXED~~ INTER-SATELLITE **ADD** S5.XXX ~~MOBILE~~ ~~S5.558~~ SPACE RESEARCH (passive) ~~Amateur~~ S5.341	
IAP/14/ 157 **MOD**	**120.02 – 1~~26~~22.25**	EARTH EXPLORATION-SATELLITE (passive) ~~FIXED~~ INTER-SATELLITE **ADD** S5.XXX ~~MOBILE~~ ~~S5.558~~ SPACE RESEARCH (passive) S5.138 ~~S5.341~~	

Reason: This band is of crucial importance for passive sensing, as it is comprised the majority of the necessary 114.25-122.25 GHz band, the oxygen absorption band, with its peak at 118.75 GHz. The fixed and mobile services have been moved down to 105 - 109.5 GHz and 111.8-114.25 GHz, as sharing with passive sensors would severely restrict these services in this portion of the spectrum. The inter-satellite service needs to be limited by footnote **S5.XXX** to links between GSO satellites only, with pfd limits as specified in sharing studies in order to share the band 116-122.25 GHz with passive sensors. The secondary allocation to amateur services in the band 119.98-120.02 GHz is also moved to 122.5-123 GHz band to avoid interference to passive sensors.

GHz

122.25 – 123

Allocation to Services		
Region 1	Region 2	Region 3
<u>122.25 – 123</u>	~~EARTH EXPLORATION-SATELLITE (passive)~~ FIXED INTER-SATELLITE MOBILE **MOD** S5.558 ~~SPACE RESEARCH (passive)~~ <u>Amateur</u> S5.138 ~~S5.341~~	

IAP/14/ 158
MOD

Reason: The passive sensor allocations have been deleted from this band, as they are not needed for remote sensing applications. A secondary amateur service allocation has been added to compensate for the deletion of their allocation in the 119.98-120.02 GHz band.

GHz

123 – 126

Allocation to Services		
Region 1	Region 2	Region 3
<u>123</u> - 126	~~EARTH EXPLORATION-SATELLITE (passive)~~ FIXED <u>FIXED-SATELLITE (space-to-Earth)</u> INTER-SATELLITE MOBILE **MOD** S5.558 <u>MOBILE-SATELLITE</u> <u>RADIONAVIGATION</u> <u>RADIONAVIGATION-SATELLITE</u> ~~SPACE RESEARCH (passive)~~ <u>Radio Astronomy</u> ~~S5.138 S5.341~~	

IAP/14/ 159
MOD

Reason: This band is not required for passive sensor operations and those allocations have been deleted. Satellite downlinks from 141-153 GHz band have been moved to the 123-130 GHz band to avoid interference to the radio astronomy service. The radio astronomy service is added on a secondary basis, for possible use in wide-band continuum observations. Sharing conditions between the ISS and the FSS, MSS, RNS and RNSS services need to be developed, but no imminent use of the band by these services is contemplated. The MSS directional indicator has been left undefined. The

footnotes **S5.138** and **S5.341** do not apply to this band due to changed band limit, and are consequentially deleted.

GHz

126 – 130

Allocation to Services		
Region 1	Region 2	Region 3
126 – ~~134~~ 130	~~FIXED~~ FIXED SATELLITE (space-to-Earth) ~~INTER-SATELLITE~~ ~~MOBILE S5.558~~ MOBILE SATELLITE ~~RADIOLOCATION S5.559~~ RADIONAVIGATION RADIONAVIGATION-SATELLITE Radio Astronomy **MOD** S5.554	

IAP/14/ 160
MOD

Reason: Satellite downlinks from 141-153 GHz band have been moved to the 123-130 GHz band to avoid interference to the radio astronomy service. The radio astronomy service is added on a secondary basis for spectral line and wide-band continuum observations. The fixed, mobile, inter-satellite and radiolocation allocations have been relocated to improve sharing situations. Sharing conditions between the FSS, MSS, RNS and RNSS services need to be developed, but no imminent use of the band by these services is contemplated. The MSS directional indicator has been left undefined. The footnote **S5.554** has been modified to include this band.

GHz

130 – 134

Allocation to Services		
Region 1	Region 2	Region 3
130 – 134	FIXED INTER-SATELLITE MOBILE **MOD** S5.558 RADIO ASTRONOMY ~~RADIOLOCATION S5.559~~ MOD S5.149	

IAP/14/ 161
MOD

Reason: The addition of a radio astronomy allocation and **RES RAS** satisfies the requirements for radio astronomy spectral line and wide band continuum observations from remote locations world-wide. Sharing conditions between the RAS and the ISS need to be developed. Footnote **S5.558** is modified to reflect new mobile service band limit. Radiolocation service has been relocated, to improve sharing conditions.

GHz

134 – 136

Allocation to Services		
Region 1	Region 2	Region 3
134 – ~~142~~ 136	AMATEUR AMATEUR-SATELLITE ~~MOBILE S5.553~~ ~~MOBILE-SATELLITE~~ ~~RADIONAVIGATION~~ ~~RADIONAVIGATION-SATELLITE~~ Radio Astronomy ~~Radiolocation~~ ~~S5.149 S5.340 S5.554 S5.555~~	

IAP/14/ 162
MOD

Reason: The amateur and amateur-satellite services are moved here from 142-144 GHz band to avoid interference to radio astronomy at higher frequencies. Radio astronomy is added as secondary service. All footnotes are deleted, as they no longer apply to this band.

GHz

136 – 141

Allocation to Services		
Region 1	Region 2	Region 3
136 – 141	~~MOBILE S5.553~~ ~~MOBILE-SATELLITE~~ RADIO ASTRONOMY RADIOLOCATION ~~RADIONAVIGATION~~ ~~RADIONAVIGATION-SATELLITE~~ Amateur Amateur-Satellite ~~Radiolocation~~ **MOD** S5.149 ~~S5.340 S5.554 S5.555~~	

IAP/14/ 163
MOD

Reason: Services currently allocated to 144 -149 GHz band are moved to this band to facilitate realignment. The addition of a radio astronomy allocation and **RES RAS** satisfies the requirements for radio astronomy spectral line and wide band continuum observations from remote locations worldwide. This band added to those listed under **S5.149**. Since this band is no longer passive, it is removed from **S5.340**. The footnote **S5.554** no longer applies to this band and is deleted. Footnote **S5.555** no longer

needed, as the radio astronomy service is allocated on a primary basis in the entire 136-141 GHz band.

GHz

141 – 148.5

	Allocation to Services		
	Region 1	Region 2	Region 3
IAP/14/ 164 **MOD**	**<u>141</u> – 142**	<u>FIXED</u> MOBILE ~~S5.553~~ ~~MOBILE-SATELLITE~~ <u>RADIO ASTRONOMY</u> <u>RADIOLOCATION</u> ~~RADIONAVIGATION~~ ~~RADIONAVIGATION-SATELLITE~~ ~~Radiolocation~~ **MOD** S5.149 ~~S5.340 S5.554 S5.555~~	
IAP/14/ 165 **MOD**	**142 – 144**	~~AMATEUR~~ ~~AMATEUR-SATELLITE~~ <u>FIXED</u> <u>MOBILE</u> <u>RADIO ASTRONOMY</u> <u>RADIOLOCATION</u> **<u>MOD</u>** S5.149	
IAP/14/ 166 **MOD**	**144 – ~~149~~ <u>148.5</u>**	<u>FIXED</u> <u>MOBILE</u> <u>RADIO ASTRONOMY</u> RADIOLOCATION ~~Amateur~~ ~~Amateur-Satellite~~ **MOD** S5.149 ~~S5.555~~	

Reason: Allocations are transferred to the 141-148.5 GHz band from the 126-134 GHz band to allow for radio astronomy allocations in this band. The bandwidth has been reduced to 7.5 GHz to accommodate EES (passive) and SR (passive) requirements in the 148.5-151.5 GHz band. The addition of a radio astronomy allocation and **RES RAS** satisfies the requirements for radio astronomy spectral line and wide band continuum observations from remote locations worldwide. Since the 141-142 GHz sub-band is no longer passive, **S5.340** is deleted from that band and modified accordingly. All sub-bands are added to those listed under **S5.149**. Footnotes **S5.554**

and **S5.555** no longer apply to any portion of this band and are deleted and modified accordingly.

GHz

148.5 – 151.5

	Allocation to Services		
	Region 1	Region 2	Region 3
IAP/14/ 167 **MOD**	**<u>148.5</u> – 149**	<u>EARTH EXPLORATION-SATELLITE (passive)</u> <u>RADIO ASTRONOMY</u> ~~RADIOLOCATION~~ <u>SPACE RESEARCH (passive)</u> ~~Amateur~~ ~~Amateur-Satellite~~ ~~S5.149~~ **<u>MOD</u>** <u>S5.340</u> ~~S5.555~~	
IAP/14/ 168 **MOD**	**149 – 150**	<u>EARTH EXPLORATION-SATELLITE (passive)</u> ~~FIXED~~ ~~FIXED-SATELLITE (space-to-Earth)~~ ~~MOBILE~~ <u>RADIO ASTRONOMY</u> <u>SPACE RESEARCH (passive)</u> **<u>MOD</u>** <u>S5.340</u>	
IAP/14/ 169 **MOD**	**150 – 151**	EARTH EXPLORATION-SATELLITE (passive) ~~FIXED~~ ~~FIXED-SATELLITE (space-to-Earth)~~ ~~MOBILE~~ <u>RADIO ASTRONOMY</u> SPACE RESEARCH (passive) ~~S5.149~~ **<u>MOD</u>** <u>S5.340</u> ~~S5.385~~	
IAP/14/ 170 **MOD**	**151 – <u>151.5</u>**	<u>EARTH EXPLORATION-SATELLITE (passive)</u> ~~FIXED~~ ~~FIXED-SATELLITE (space-to-Earth)~~ ~~MOBILE~~ <u>RADIO ASTRONOMY</u> <u>SPACE RESEARCH (passive)</u> **<u>MOD</u>** <u>S5.340</u>	

Reason: The current passive allocation of 150-151 GHz has insufficient bandwidth for remote sensing observations and is not adequately protected from potential interference. The scientific requirement is for a 3 GHz band centered at 150 GHz for use in

conjunction with water vapour observations around 183 GHz. Also, the 150.74 GHz nitrous oxide line at required for microwave limb sounding applications. All active services are relocated from this band to meet these requirements. Since the 148.5-151.5 GHz band is now purely passive, it is added to those listed under **S5.340**. For the same reason, there is no need to include the band 150-151 GHz in **S5.149**, and it is deleted from this footnote. The footnotes **S5.385** (150-151 GHz band) and **S5.555** (148.5-149 GHz band) are no longer needed and are deleted from these bands.

GHz

151.5 – 155.5

Allocation to Services		
Region 1	Region 2	Region 3
151.5 – 156 155.5	FIXED ~~FIXED-SATELLITE (space-to-Earth)~~ MOBILE RADIO ASTRONOMY RADIOLOCATION **MOD** S5.149	

IAP/14/ 171
MOD

Reason: The FSS downlink allocation is incompatible with radio astronomy requirements in this band and is relocated elsewhere. The addition of a radio astronomy allocation and **RES RAS** satisfies the requirements for radio astronomy spectral line and wide band continuum observations from remote locations worldwide. This band is added to those listed under footnote **S5.149**. The additional radiolocation allocation compensates for removal from the 126-134 GHz band.

GHz

155.5 – 158.5

	Allocation to Services		
	Region 1	Region 2	Region 3
IAP/14/ 172 **MOD**	**155.5 – 156** S5.AAA	EARTH EXPLORATION-SATELLITE (passive) **ADD** S5.AAA FIXED **ADD** S5.BBB ~~FIXED-SATELLITE (space-to-Earth)~~ MOBILE **ADD** S5.BBB RADIO ASTRONOMY SPACE RESEACH (passive) **ADD** S5.CCC **MOD** S5.149	
IAP/14/ 173 **MOD**	**156 – 158** S5.AAA	EARTH EXPLORATION-SATELLITE (passive) **ADD** S5.AAA FIXED **ADD** S5.BBB ~~FIXED-SATELLITE (space-to-Earth)~~ MOBILE **ADD** S5.BBB RADIO ASTRONOMY SPACE RESEACH (passive) **ADD** S5.CCC **MOD** S5.149	
IAP/14/ 174 **MOD**	**158 – ~~164~~58.5** S5.AAA	EARTH EXPLORATION-SATELLITE (passive) **ADD** S5.AAA FIXED **ADD** S5.BBB ~~FIXED-SATELLITE (space-to-Earth)~~ MOBILE **ADD** S5.BBB RADIO ASTRONOMY SPACE RESEACH (passive) **ADD** S5.CCC **MOD** S5.149	

Reason: The scientific requirement is for a 3 GHz band centered at 157 GHz for use in conjunction with water vapour observations around 183 GHz. This allocation is only required until 2018 since current planned and operational instruments are already in this band. By 2018, all of these applications will have transitioned to the 148.5-151.5 GHz band. The FSS downlink allocation is incompatible with radio astronomy requirements and is relocated. The addition of a radio astronomy allocation and **RES RAS** satisfies the requirements for radio astronomy spectral line and wide band continuum observations from remote locations worldwide. These sub-bands are added to those listed under **S5.149**. EES operations in the band 155.5-158.5 GHz need to be protected until 1/1/2018. After this date the fixed and mobile services need to co-ordinate with radio astronomy sites only. The space research (passive) allocation is limited to space-based radio astronomy in this band.

GHz

158.5 – 164

Allocation to Services		
Region 1	Region 2	Region 3
158.5 – 164	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth)	

IAP/14/ 175
MOD

Reason: Mobile-satellite allocation has been added to partially compensate for loss of 134-142 GHz band.

GHz

164 – 167

Allocation to Services		
Region 1	Region 2	Region 3
164 – 168<u>7</u>	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) **<u>MOD</u>** <u>S5.340</u>	

IAP/14/ 176
MOD

Reason: Passive sensors require only this 3 GHz band from the current 164-168 GHz passive allocation. It is essential to maintain the 164 - 167 GHz portion of the band passive. The **MOD** refers to the band limits and addition of the band to footnote **S5.340** only, no change **<u>(NOC)</u>** is proposed to the allocations within this sub-band. This band, along with the band 148.5-151.5 GHz will become the harmonised reference window for passive sensor observations of the 183.31 GHz water vapor line. The band is also used for microwave limb sounding of the 164.38 GHz ClO line. This passive band has been added to those listed under **S5.340**; the 164-168 GHz band had been omitted from **S5.340**.

GHz

167 – 174.8

	Allocation to Services		
	Region 1	Region 2	Region 3
IAP/14/ 177 MOD	**<u>167</u> – 168**	~~EARTH EXPLORATION-SATELLITE (passive)~~ <u>FIXED</u> <u>FIXED-SATELLITE (space-to-Earth)</u> <u>INTER-SATELLITE</u> <u>MOBILE **MOD** S5.558</u> ~~RADIO ASTRONOMY~~ ~~SPACE RESEARCH (passive)~~	
IAP/14/ 178 MOD	**168 – 170**	FIXED <u>FIXED-SATELLITE (space-to-Earth)</u> <u>INTER-SATELLITE</u> <u>MOBILE **MOD** S5.558</u>	
IAP/14/ 179 MOD	**170 – 174.5**	FIXED <u>FIXED-SATELLITE (space-to-Earth)</u> INTER-SATELLITE MOBILE **MOD** S5.558 ~~S5.149 S5.385~~	
IAP/14/180 MOD	**174.5 – 17~~6.5~~<u>4.8</u>**	~~EARTH EXPLORATION-SATELLITE (passive)~~ FIXED INTER-SATELLITE MOBILE **MOD** S5.558 ~~SPACE RESEARCH (passive)~~ ~~S5.149 S5.385~~	

Reason: Passive services do not need the 167-168 GHz band and this band is yielded to displaced active services. Fixed, mobile and inter-satellite services are added to the 167-174.8 GHz band as well as fixed-satellite downlinks to the 167-174.5 GHz band to compensate for deletions in other bands. Passive sensor allocations are deleted from the 174.5-174.8 GHz band to properly adjust the band edge for the 183.3 GHz remote sensing requirement. Footnotes **S5.149** and **S5.385** are deleted from these bands and are appropriately modified. Footnote **S5.558** is added next to mobile allocations in this band and the footnote is modified to include the 167-174.8 GHz band due to sharing with the inter-satellite service.

GHz

174.8 – 191.8

	Allocation to Services		
	Region 1	Region 2	Region 3
IAP/14/ 181 MOD	**174.~~5~~8 – 176.5**	EARTH EXPLORATION-SATELLITE (passive) ~~FIXED~~ INTER-SATELLITE **ADD** S5.YYY ~~MOBILE S5.558~~ SPACE RESEARCH (passive) ~~S5.149 S5.385~~	
IAP/14/ 182 MOD	**176.5 – 182**	EARTH EXPLORATION-SATELLITE (passive) ~~FIXED~~ INTER-SATELLITE **ADD** S5.YYY ~~MOBILE S5.558~~ SPACE RESEARCH (passive) ~~S5.149~~ ~~S5.385~~	
IAP/14/ 183 MOD	**182 – 185**	EARTH EXPLORATION-SATELLITE (passive) ~~RADIO ASTRONOMY~~ SPACE RESEARCH (passive) **MOD** S5.340 S5.563	
IAP/14/ 184 MOD	**185 – 190**	EARTH EXPLORATION-SATELLITE (passive) ~~FIXED~~ INTER-SATELLITE **ADD** S5.YYY ~~MOBILE S5.558~~ SPACE RESEARCH (passive) ~~S5.149~~ ~~S5.385~~	
IAP/14/ 185 MOD	**190 – ~~200~~191.8**	EARTH EXPLORATION-SATELLITE (passive) ~~MOBILE S5.553~~ ~~MOBILE-SATELLITE~~ ~~RADIONAVIGATION~~ ~~RADIONAVIGATION-SATELLITE~~ SPACE RESEARCH (passive) ~~S5.341 S5.554~~ **MOD** S5.340	

Reason: The band 174.8-191.8 GHz is of crucial importance for passive sensing of the water vapour absorption line whose peak is at 183.31 GHz. Sharing with fixed and mobile services is not practical, so these services are relocated. The inter-satellite service needs to be limited to links between GSO satellites and to a pfd limit as specified in sharing studies. Footnote **S5.YYY** is added to reflect this requirement. The entire band is deleted from those listed under **S5.149**, **S5.385** (secondary radio astronomy allocation). All applicable footnotes are appropriately modified. Since no terrestrial radio astronomy use of the band 182-185 GHz is possible due to high atmospheric absorption, the radio astronomy allocation is deleted. Active services are moved from the 190-191.8 GHz band to make room for the addition of passive sensor allocations. The footnote **S5.554** is deleted from this band, to reflect removal of active services, and modified to reflect this change. **S5.341** does not apply to this band and is deleted. The footnote **S5.340** has been modified to include this band.

GHz

191.8 – 200

Allocation to Services		
Region 1	Region 2	Region 3
<u>191.8</u> – 200	<u>FIXED</u> **MOD** S5.553 <u>INTER-SATELLITE</u> MOBILE **MOD** S5.553 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE S5.341 **MOD** S5.554	

IAP/14/ 186
MOD

Reason: Inter-satellite and fixed service allocations added to compensate for deletions from other bands. The footnotes **S5.553** and **S5.554** modified to reflect deletion of terrestrial services from 190.0 -191.8 GHz band, and to include stations in the fixed service, allocated to the 191.8-200 GHz band.

GHz

200 – 209

	Allocation to Services		
	Region 1	Region 2	Region 3
IAP/14/ 187 **MOD**	**200 – 202**	EARTH EXPLORATION-SATELLITE (passive) ~~FIXED~~ ~~MOBILE~~ RADIO ASTRONOMY SPACE RESEARCH (passive) **MOD** S5.340 S5.341	
IAP/14/ 188 **MOD**	**202 – 2~~17~~09**	EARTH EXPLORATION-SATELLITE (passive) ~~FIXED~~ ~~FIXED-SATELLITE (Earth-to-space)~~ ~~MOBILE~~ RADIO ASTRONOMY SPACE RESEARCH (passive) **MOD** S5.340 S5.341	

Reason: This band is the optimum band for microwave limb sounding of water vapour and other atmospheric constituents in the low troposphere. Fixed and mobile services as well as the fixed-satellite uplink in the 202-209 GHz band are all relocated to meet this requirement. Footnote **S5.340** is consequentially modified, to include this band. A radio astronomy allocation has been added to satisfy the requirement for radio astronomy spectral line and wide band continuum observations.

GHz

209 – 217

Allocation to Services		
Region 1	Region 2	Region 3
<u>209</u> – 217	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE <u>RADIO ASTRONOMY</u> **<u>MOD</u>** <u>S5.149</u> S5.341	

IAP/14/ 189
MOD

Reason: The addition of a radio astronomy allocation and **RES RAS** satisfies the requirements for radio astronomy spectral line and wide band continuum observations from remote locations world-wide. This band has been added to those listed under **S5.149**.

GHz

217 – 226

Allocation to Services		
Region 1	Region 2	Region 3
217 – 2~~31~~<u>26</u>	~~EARTH EXPLORATION-SATELLITE (passive)~~ <u>FIXED</u> <u>FIXED-SATELLITE (Earth-to-space)</u> <u>MOBILE</u> RADIO ASTRONOMY SPACE RESEARCH (passive) **<u>ADD</u>** <u>S5.CCC</u> **<u>MOD</u>** <u>S5.149</u> ~~S5.340~~ S5.341	

IAP/14/ 190
MOD

Reason: Passive sensors do not need this band and the EESS allocation is deleted. Fixed and mobile services and fixed-satellite uplinks are moved to this band from other locations. This band is no longer passive; consequentially it now needs to be listed under footnote **S5.149**. This band has been removed from footnote **S5.340** and footnote **S5.340** has been deleted from this band.

GHz

226 – 231.5

Allocation to Services		
Region 1	Region 2	Region 3
<u>226</u> – 231	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) **MOD** S5.340 ~~S5.341~~	
231 – 23~~5~~1.5	<u>EARTH EXPLORATION-SATELLITE (passive)</u> ~~FIXED~~ ~~FIXED-SATELLITE (space-to-Earth)~~ ~~MOBILE~~ <u>RADIO ASTRONOMY</u> <u>SPACE RESEARCH (passive)</u> ~~Radiolocation~~ <u>**MOD** S5.340</u> ~~S5.341~~	

IAP/14/ 191
MOD

IAP/14/ 192
MOD

Reason: It is essential to maintain the 226-231.5 GHz band passive. The **MOD** refers to the band limits only; no change **<u>(NOC)</u>** is proposed to the allocations within this sub-band. Passive sensors require exclusive use of only the 226-231.5 GHz portion of the 217-231 GHz band for microwave limb sounding of atmospheric constituents. In addition, this band contains a 4 GHz reference window for higher frequency water vapor measurements. This band is of vital importance to the radio astronomy service for observations of the 230.5 GHz CO line. The footnote **S5.340** is modified to take into account that 217-226 GHz band is no longer passive, while adding the 231-231.5 GHz band. The fixed and mobile services, as well as the fixed-satellite downlinks, have been deleted from the 231-231.5 GHz portion to allow passive observations in this band.

GHz

231.5 – 235

Allocation to Services		
Region 1	Region 2	Region 3
<u>231.5</u> – 235	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Radiolocation	

IAP/14/ 193
MOD

Reason: The only required change in this band is the 500 MHz upward adjustment of the lower band edge (see the previous modification).

GHz

235 – 238

Allocation to Services		
Region 1	Region 2	Region 3
235 – 238	EARTH EXPLORATION-SATELLITE (passive) FIXED ~~FIXED-SATELLITE (space-to-Earth)~~ MOBILE <u>RADIO ASTRONOMY</u> SPACE RESEARCH (passive)	

IAP/14/ 194
MOD

Reason: Passive sensors are limited to microwave limb sounding in the band 235-238 GHz and can share with terrestrial services due to the absorption characteristics of this band. The fixed-satellite downlink is not compatible with the radio astronomy requirement for this band and is reallocated elsewhere. The addition of a radio astronomy allocation and **RES RAS** satisfies the requirements for radio astronomy spectral line and wide band continuum observations from remote locations world-wide.

GHz

238 – 241

Allocation to Services		
Region 1	Region 2	Region 3
238 – 241	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE <u>RADIOLOCATION</u> <u>RADIONAVIGATION</u> <u>RADIONAVIGATION-SATELLITE</u> ~~Radiolocation~~	

IAP/14/ 195
MOD

Reason: Additional allocations to the radiolocation, radionavigation and radionavigation-satellite services, to compensate for allocation changes in the 150-160 GHz frequency range.

GHz

241 – 248

IAP/14/ 196
MOD

Allocation to Services		
Region 1	Region 2	Region 3
241 – 248	RADIOLOCATION RADIO ASTRONOMY Amateur Amateur-Satellite S5.138 **MOD** S5.149	

Reason: The addition of a radio astronomy allocation and **RES RAS** satisfies the requirements for radio astronomy spectral line and wide band continuum observations from remote locations world-wide. This band is added to those listed under footnote **S5.149**. There is no change in sharing between existing services, except for the introduction of the radio astronomy service allocation in band.

GHz

248 – 250

IAP/14/ 197
MOD

Allocation to Services		
Region 1	Region 2	Region 3
248 – 250	AMATEUR AMATEUR-SATELLITE Radio Astronomy	

Reason: The radio astronomy service allocation is added on a secondary basis.

GHz

250 – 252

IAP/14/ 198
MOD

Allocation to Services		
Region 1	Region 2	Region 3
250 – 252	EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) RADIO ASTRONOMY ~~S5.149 S5.555~~ **MOD** S5.340	

Reason: Microwave limb sounding of nitrous oxide near 251 GHz defines the passive-sensing requirement for this band. Radio astronomy is added to the other passive services. The addition of another passive service does not alter sharing scenario. The footnotes **S5.149** and **S5.555** are consequentially deleted and band lists in these footnotes are appropriately modified. The footnote **S5.340** is added to reflect the passive nature of band.

GHz

252 – 265

Allocation to Services		
Region 1	Region 2	Region 3
252 – 265	FIXED **MOD** S5.553 MOBILE **MOD** S5.553 MOBILE-SATELLITE (Earth-to-space) RADIONAVIGATION RADIONAVIGATION-SATELLITE RADIO ASTRONOMY **MOD** S5.149 ~~S5.385~~ S5.554 ~~S5.555 S5.564~~	

IAP/14/ 199
MOD

Reason: The fixed service is relocated to this band due to other allocation actions in other bands. The addition of a radio astronomy allocation, along with **RES RAS,** satisfy requirements for radio astronomy spectral line (current secondary allocation to radio astronomy at 257.5 - 258 GHz deleted) and wide band continuum observations from remote locations worldwide. The directional indicator added to mobile-satellite service allocation, which is paired with allocation in the 190-200 GHz band. Atmospheric absorption in the 252-265 GHz band is relatively constant and somewhat higher than in the paired downlink band. This entire band is added to those listed under footnote **S5.149**, and the band is deleted from **S5.385** and **S5.555**. The footnotes **S5.385** and **S5.555** have been modified to reflect changes. The footnote **S5.564** is no longer needed in this band due to the worldwide nature of the radio astronomy allocation.

GHz

265 – 275

Allocation to Services		
Region 1	Region 2	Region 3
265 – 275	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY **MOD** S5.149	

IAP/14/ 200
NOC

GHz

275 – 400

Allocation to Services		
Region 1	Region 2	Region 3
275 – ~~400~~ 1000 (Not allocated) **MOD** S5.565		

IAP/14/ 201
MOD

Reason: The change of the upper limit for applicability of footnote **MOD S5.565** is to account for various passive service needs above 275 GHz that have been identified by administrations. Many lines and windows required for radio astronomy observations and passive remote sensing of the Earth exist above 275 GHz.

IAP/14/ 202
MOD

S5.149 In making assignments to stations of other services to which the bands:

13 360-13 410 kHz,
25 550-25 670 kHz,
37.5-38.25 MHz,
73-74.6 MHz in
Regions 1 and 3,
150.05-153 MHz in
Region 1,
322-328.6 MHz*,
406.1-410 MHz,
608-614 MHz in
Regions 1 and 3,
1 330-1 400 MHz*,
1 610.6-1 613.8 MHz*,
1 660-1 670 MHz,
1 718.8-1 722.2 MHz*,
2 655-2 690 MHz,
3 260-3 267 MHz*,
3 332-3 339 MHz*,
3 345.8-3 352.5 MHz*,
4 825-4 835 MHz*,
4 950-4 990 MHz,
4 990-5 000 MHz,
6 650-6 675.2 MHz*,
10.6-10.68 GHz,
14.47-14.5 GHz*,
22.01-22.21 GHz*,
22.21-22.5 GHz,
22.81-22.86 GHz*,
23.07-23.12 GHz*,
31.2-31.3 GHz,
31.5-31.8 GHz in
Regions 1 and 3,
36.43-36.5 GHz*,
42.5-43.5 GHz,
42.77-42.87 GHz*,
43.07-43.17 GHz*,
43.37-43.47 GHz*,
48.94-49.04 GHz*,
~~72.77-72.91 GHz*,~~
76.5-81.5 GHz
81.5-84.5 GHz,
84.5-86 GHz
~~93.07-93.27 GHz*,~~
92-94 GHz,
94.1-95 GHz,
95-100 GHz,
~~97.88-98.08 GHz*,~~
100-102 GHz,
102-105 GHz,
105-109.5 GHz
111.8-114.25 GHz
140.69-140.98 GHz*,
141-148.5 GHz,
148.5-151.5 GHz
~~144.68-144.98 GHz*,~~
~~145.45-145.75 GHz*,~~
~~146.82-147.12 GHz*,~~
~~150-151 GHz*,~~
174.42-175.02 GHz*,
177-177.4 GHz*,
178.2-178.6 GHz*,
181-181.46 GHz*,
~~186.2-186.6 GHz*,~~
209-226 GHz
~~250-251 GHz*,~~
~~257.5-258 GHz*,~~
~~261-265 GHz,~~
~~262.24-262.76 GHz*,~~
252-265 GHz
265-275 GHz,
~~265.64-266.16 GHz*,~~
~~267.34-267.86 GHz*,~~
~~271.74-272.26 GHz~~

* are allocated (* indicates radio astronomy use for spectral line observations), administrations are urged to take all practicable steps to protect the radio astronomy service from harmful interference. Emissions from spaceborne or airborne stations can be particularly serious sources of interference to the radio astronomy service (see Nos. **S4.5** and **S4.6** and Article **S29**).

Reason: The changes to this footnote are consequential to the changes made to the related allocations.

IAP/14/ 203
MOD

S5.340 All emissions are prohibited in the following bands:

1 400 - 1 427 MHz,	
2 690 - 2 700 MHz	except those provided for by Nos. **S5.421** and **S5.422**,
10.68 - 10.7 GHz	except those provided for by No. **S5.483**,
15.35 - 15.4 GHz	except those provided for by No. **S5.511**,
23.6 - 24 GHz,	
31.3 - 31.5 GHz,	
31.5 - 31.8 GHz	in Region 2,
48.94 - 49.04 GHz	from airborne stations,
50.2 – 50.4[1] GHz	except those provided for by No. **S5.555A**,
52.6 – 54.25 GHz	
86 - 92 GHz,	
~~105 - 116 GHz,~~	
109.5 - 111.8 GHz,	
114.25 - 116 GHz,	
~~140.69 - 140.98 GHz~~	~~from airborne stations and from space stations in the space-to-Earth direction~~,
148.5-151.5 GHz,	
164 - 167 GHz,	
182 - 185 GHz	except those provided for by No. **S5.563**,
190 - 191.8 GHz,	
200 - 202 GHz	
202 - 209 GHz	
~~217 - 228 GHz.~~	
226 - 231.5 GHz,	
250 - 252 GHz.	

Reason: The changes to this footnote are consequential to the changes made to the related allocations.

IAP/14/ 204
NOC

S5.341 In the bands 1 400 - 1 727 MHz, 101 - 120 GHz and 197 - 220 GHz, passive research is being conducted by some countries in a programme for the search for intentional emissions of extraterrestrial origin.

Reason: This informational footnote is still accurate.

IAP/14/ 205
MOD

S5.385 *Additional allocation:* the band~~s~~ 1 718.8 - 1 722.2 MHz, ~~150 - 151 GHz, 174.42 - 175.02 GHz, 177 - 177.4 GHz, 178.2 - 178.6 GHz, 181 - 181.46 GHz, and 186.2 - 186.6 GHz and 257.5 - 258 GHz are~~ is also allocated to the radio astronomy service on a secondary basis for spectral line observations.

Reason: The changes to this footnote are consequential to the changes made to the related allocations.

IAP/14/ 206
MOD

S5.553 In the bands 43.5 - 47 GHz, 66 - 71 GHz, 95 - 100 GHz, ~~134 - 142 GHz, 190~~191.8 - 200 GHz and 252 - 265 GHz, stations in the fixed and land mobile service may be operated subject to not causing harmful interference to the space radiocommunication services to which these bands are allocated (see No. **S5.43**).

Reason: The changes to this footnote are consequential to the changes made to the related allocations.

IAP/14/207
MOD

S5.554 In the bands 43.5 - 47 GHz, 66 - 71 GHz, 95 -100 GHz, ~~134 - 142~~ 126 - 134 GHz, 19~~0~~1.8 - 200 GHz and 252 - 265 GHz, satellite links connecting land stations at specified fixed points are also authorized when used in conjunction with the mobile-satellite service or the radionavigation-satellite service.

Reason: The changes to this footnote are consequential to the changes made to the related allocations.

IAP/14/ 208
MOD

S5.555 *Additional allocation:* the band~~s~~ 48.94 - 49.04 GHz, ~~97.88 - 98.08 GHz, 140.69 - 140.98 GHz, 144.68 - 144.98 GHz, 145.45 - 145.75 GHz, 146.82 - 147.12 GHz, 250 - 251 GHz and 262.24 - 262.76 GHz are~~ is also allocated to the radio astronomy service on a primary basis.

Reason: The changes to this footnote are consequential to the changes made to the related allocations.

IAP/14/ 209
MOD

S5.556 In the bands 51.4 - 54.25 GHz, 58.2 - 59 GHz~~,~~ and 64 - 65 GHz, ~~72.77 - 72.91 GHz and 93.07 - 93.27 GHz,~~ radio astronomy observations may be carried out under national arrangements.

Reason: The changes to this footnote are consequential to the changes made to the related allocations.

IAP/14/ 210
MOD

S5.558 In the bands 55.78-58.2 GHz, 59-64 GHz, 66-71 GHz, ~~123 - 134~~ 122.5 - 126 GHz, ~~170-182~~ 167 – 174.8 GHz and 185-190 GHz, stations in the aeronautical mobile service may be operated subject to not causing harmful interference to the inter-satellite service (see No. **S5.43**).

Reason: The changes to this footnote are consequential to the changes made to the related allocation.

IAP/14/ 211
MOD

S5.559 In the band~~s~~ 59 - 64 GHz ~~and 126 - 134 GHz,~~ airborne radars in the radiolocation service may be operated subject to not causing harmful interference to the inter-satellite service (see No. **S5.43**).

Reason: The changes to this footnote are consequential to the changes made to the related allocation. The radiolocation and inter-satellite services are no longer co-allocated in this spectral region.

IAP/14/ 212
NOC

S5.560 In the band 78 - 79 GHz radars located on space stations may be operated on a primary basis in the earth exploration-satellite service and in the space research service.

Reason: No change is required to this footnote

IAP/14/ 213

MOD

S5.561 In the band ~~84 - 86~~ 74 - 76 GHz, stations in the fixed~~,~~ and mobile ~~and broadcasting~~ services shall not cause harmful interference to broadcasting-satellite stations operating in accordance with the decisions of the appropriate frequency assignment planning conference for the broadcasting-satellite service.

Reason: The broadcasting satellite allocation has been transferred to the 74-76 GHz band and the broadcasting and broadcasting satellite services are no longer co-allocated.

IAP/14/ 214

NOC

S5.562 The use of the band 94-94.1 GHz by the earth exploration-satellite (active) and space research (active) services is limited to spaceborne cloud radars.

Reason: This footnote was the result of allocation decisions made at WRC-97 and no change is needed.

IAP/14/ 215
SUP

~~**S5.564** Additional allocation: in Germany, Argentina, Spain, Finland, France, India, Italy, the Netherlands and Sweden, the band 261 - 265 GHz is also allocated to the radio astronomy service on a primary basis.~~

Reason: The radio astronomy allocation is now worldwide in the 261-265 GHz band, therefore a country footnote is no longer needed.

IAP/14/ 216
MOD

S5.565 The frequency band 275 - ~~400~~ 1000GHz may be used by administrations for experimentation with, and development of, various active and passive services. In this band a need has been identified for the following spectral line measurements for passive services:

– radio astronomy service: ~~278 - 280 GHz and 343 - 348~~ 275 - 323, 327-371, 388 - 43~~4~~ GHz, 426 - 442 GHz, 453 - 510 GHz, 623 - 711 GHz, and 795 - 909 GHz

– Earth exploration-satellite service (passive) and space research service (passive): 275 - 277 GHz, ~~300~~294 – 30~~2~~6 GHz, 3~~24~~16 – 3~~26~~34 GHz, 34~~5~~2 – 34~~7~~9 GHz, 363 – 365 GHz, ~~and~~ 37~~9~~1 – 38~~1~~9 GHz, 416 – 434 GHz, 442 – 444 GHz, 496 – 506 GHz, 546 – 568 GHz, 624 – 629 GHz, 634 – 654 GHz, 659 – 661 GHz, 684 – 692 GHz, 730 – 732 GHz, 851 – 853 GHz and 951 – 956 GHz.

Future research in this largely unexplored spectral region may yield additional spectral lines and continuum bands of interest to the passive services. Administrations are

urged to take all practicable steps to protect these passive services from harmful interference until the next competent world radio conference.

Reason: These additional bands have been identified by various administrations as bands that will also be used for radio astronomy observations and spaceborne passive remote sensing.

IAP/14/ 217
ADD

S5.AAA In the band 155.5 - 158.5 GHz, the allocation to the Earth exploration-satellite (passive) and space research (passive) services shall terminate on 1 January 2018.

Reason: This allocation will not be needed by passive sensors after the termination date. By the termination date, all passive sensors will have transitioned to the 148.5 - 151.5 GHz band.

IAP/14/ 218
ADD

S5.BBB The date of entry for the allocation to the fixed and mobile services in the band 155.5 - 158.5 GHz shall be 1 January 2018.

Reason: Passive sensors require the use of this band until 1 January 2018.

IAP/14/ 219
ADD

S5.CCC Use of this allocation is limited to space-based radio astronomy only.

Reason: This band is a likely candidate for a future space based radio astronomy mission. No other space research use is contemplated.

IAP/14/ 220
ADD

S5.DDD The 81 - 81.5 GHz band is also allocated to the amateur and amateur-satellite services on a secondary basis.

Reason: Amateur allocation

IAP/14/ 221
ADD

S5.EEE The band 75.5-76 GHz is also allocated to the amateur and amateur-satellite services on a primary basis until the year 200[6].

Reason: Amateur allocation

IAP/14/ 222
ADD

S5.YYY Use of the bands 174.5-182 GHz by the inter-satellite service is limited to satellites in the geostationary-satellite orbit. The single-entry power flux-density, at all altitudes from 0 km to 1 000 km above the Earth's surface and in the vicinity of all geostationary orbital positions occupied by passive sensors, produced by a station in the inter-satellite service, for all conditions and for all methods of modulation, shall not exceed -144 dBW/m^2/MHz for all angles of arrival.

Reason: This footnote is required to protect passive sensors operating in this band.

IAP/14/ 223
ADD

S5.XXX Use of the bands 116-123 GHz by the inter-satellite service is limited to satellites in the geostationary-satellite orbit. The single-entry power flux-density, at all altitudes from 0 km to 1 000 km above the Earth's surface and in the vicinity of all geostationary orbital positions occupied by passive sensors, produced by a station in the inter-satellite service, for all conditions and for all methods of modulation, shall not exceed -148 dBW/m^2/MHz for all angles of arrival.

Reason: This footnote is required to protect passive sensors operating in this band.

IAP/14/ 224

ADD

RESOLUTION RAS

USE OF THE BANDS [ ] BY THE RADIO ASTRONOMY SERVICE

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that a large number of spectral lines of astrophysical interest above 71 GHz provide unique information about cosmic processes, such as the chemistry of the interstellar medium and the formation of stars and planets, and that this information cannot be obtained from any other source;

b) that Doppler shifted lines, which are also of great interest for astronomical studies, are found far removed from the rest frequency of some spectral lines and that highly Doppler shifted lines may offer the only means to obtain information about the very early Universe and the formation of galaxies;

c) that mm-wave radio astronomy receivers are designed to cover substantial portions of the atmospheric windows above 70 GHz to take advantage of the information contained in spectral lines, as well as in continuum radiation;

d) that several Administrations operate mm-wave radio astronomy observatories and that some are building or are planning to build a limited number of large new facilities to exploit the most advanced technologies; and that these facilities are intended to serve the needs of the worldwide scientific community;

f) that mm-wave observatories must be located on high mountain tops or plateaus to take advantage of the driest possible atmospheric conditions necessary to obtain high quality observations; and require substantial investments on behalf of the scientific communities concerned, and that therefore their number will remain low,

noting

that sharing between the radio astronomy service and other terrestrial services operating in bands above 71 GHz is facilitated by the natural attenuation provided by atmospheric gases, and that it can be further facilitated by adequate geographic separation,

urges:

Administrations to establish coordination zones around mm-wave radio astronomy sites operating in bands above 71 GHz. Coordination zone radii should be determined following the procedure outlined in Rec. ITU-R RA.1031-1, separately for ground based transmitters, airborne transmitters and transmitters that may be located on High Altitude Platforms (HAPS).

resolves:

1. that in the frequency bands referred to in this Resolution, co-primary status of the radio astronomy service shall be recognized within coordination zones established by Administrations. No coordination requirements should be imposed upon terrestrial services outside established coordination zones.

2. that in the bands referred to in this Resolution, co-primary services operating stations within a coordination zone should coordinate their operations with affected radio astronomy stations within five years of the date of notification of the radio astronomy site to the Radiocommunication Bureau

Annex 1 lists the radio astronomy sites that operate, or plan to operate in the bands referred to in this Resolution as of [June 8, 2000]. Observatories that operate only up to 92 GHz are identified with *** under the SITE column.

IAP/14/ 225
MOD

Annex 1

List of Radio Astronomical Observatories Operating in Bands Above 71 GHz

REGION 1

COUNTRY	SITE	LONG o ' "	LAT o ' "	ALT (m)	DIAM (m)	Remarks
Finland	Metsahovi	24 23 17	60 13 04	61	13.7	
France	Bordeaux	-00 31 37	44 50 10	73	2.5	
	Plateau de Bure[2]	05 54 26	44 38 01	2552	15	
Germany	Effelsberg	06 53 00	50 31 32	369	100	
Italy	Medicina***	11 38 43	44 31 14	44	32	EVLBI
	Noto***	15 03 00	36 31 48			EVLBI
	Sardinia	-09 14 40	39 29 50	585	64	
Russia	Zelenchukskaya	41 26 30	43 39 12	2100		
Spain	Pico Veleta	-03 23 34	37 03 58	2870	30	
	Robledo	-04 14 57	40 25 38	761		
	Yepes	-03 06 00	40 31 30	931		
Turkey	Gebse-Kocaeli	29 26 52	40 47 06	200		

[1] The Observatoire de Plateau de Bure interferometer consists of 3 antennas of 15 m diameter.

REGION 2

COUNTRY	SITE	LONG. o ' "	LAT. o ' "	ALT (m)	DIAM (m)	REMARKS
Argentina	El Leoncito (SJ)	69 18 07	31 47 57	2552	1.5	Solar telescope Sub mm
Chile	San Pedro de Atacama	67 44 00	-23 02	5000		MMA (planned)[3]
	La Silla	70 44 04	-29 15 34	2300	15	SEST
	Las Campanas	70 41 10	-29 01 43	2440	4	LMSA
	Pampa La Bola	67 42 00	-22 58 00	4800		(planned)[4]
Mexico	Sierra Negra	97 18 00	18 59 00	4500	50	Large Millimeter Telescope (LMT- under construction)

[3] The USA MMA (MilliMeter Array) will consist of 40 antennas of 8-m diameter, on a ring configuration. The diameter of the ring will be capable of variation, ranging from 80 m to 10 km across.

[4] The Japanese LMSA (Large Southern Millimeter Array) will consist of 50 antennas of 10-m diameter.

COUNTRY	SITE	LONG. o ' "	LAT. o ' "	ALT (m)	DIAM (m)	REMARKS
USA	Green Bank,WVA***	79 50 24	38 25 59	946	100	NRAO-GBT
	Socorro, NM ***	107 37 06	34 04 44	2155	25	NRAO-VLA [5]
	.....	.....	.....	.....	.....	.....
	St. Croix, VI ***	64 35 01	17 45 24	46	25	NRAO VLBA[6]
	Hancock, NH ***	71 59 12	42 56 01	340	25	NRAO VLBA
	North Liberty, IO***	91 34 27	41 46 17	272	25	NRAO VLBA
	Ft. Davis, TX ***	103 56 41	30 38 06	1646	25	NRAO VLBA
	Los Alamos, NM ***	106 14 44	35 46 31	1997	25	NRAO VLBA
	Pie Town, NM ***	108 07 09	34 18 04	2402	25	NRAO VLBA
	Kitt Peak, AZ ***	111 36 45	31 57 23	1946	25	NRAO VLBA
	Owens Valley, CA***	118 16 37	37 13 54	1237	25	NRAO VLBA
	Brewster, WA ***	119 41 00	48 07 52	286	25	NRAO VLBA
	Mauna Kea, HI ***	155 27 19	19 48 05	3751	25	NRAO VLBA
	.....	.....	.....	.....	.....	.....
	Kitt Peak, AZ	111 36 50	31 57 10	1930	12	NRAO 12 m
	Amherst, MA	72 20 40	42 23 33	314	13.7	FCRAO (Five Colleges Obs.)
	Owens Valley, CA	118 17 36	37 13 54	1236	10.4	Caltech[7]
	Hat Creek, CA	121 28 24	40 49 04	1042	6.1	BIMA[8]
	Westford, MA	71 29 19	42 37 23	122	36	Haystack Obs.
	Mauna Kea, HI	155 28 20	19 49 33	4000	10.4	J.C. Maxwell Tel.
	Mauna Kea, HI					CSO

[5] The VLA consists of 27 antennas of 25-m diameter, arranged in a Y pattern up to 36 km across.

[6] The VLBA consists of 10 antennas of 25 m diameter, distributed across the continental US, Hawaii and the US Virgin Islands

[7] The Caltech Interferometer consists of 3 antennas of 10.4 m diameter

[8] The BIMA (Berkeley-Illinois-Maryland Array) currently consists of 9 antennas of 6.1-m diameter. The final configuration will consist of 11 antennas.

REGION 3

COUNTRY	SITE	LONG. O ' "	LAT. o ' "	ALT. m	DIAM m	REMARKS
AUSTRALIA	Parkes	148 15 44	-33 00 00	60	64	
	Mopra	149 05 58	-31 16 04			
	Narrabri, NSW	149 32 56	-30 59 52			Austr. Tel. Compact Array
CHINA	Delingha	97 43 75	37 22 43	3200	13.7	
JAPAN	Nobeyama[9]	138 28 32	35 56 29	1350	45	
	Kashima	140 39 46	35 57 15	50	34	Comm.
	Mizusawa	141 08 09	39 08 00	87	10	Res. Lab.
	Nagoya	136 58 24	35 08 55	70	4	
	Mt. Fuji	138 45 06	35 21 30	3776	1.2	
	Kagoshima	130 26 32	31 44 52	520	20	Only >300GHz VERA (planned)
KOREA	Taejon	127 22 18	36 23 54	120	13.7	

Other

COUNTRY	SITE	LONG. o ' "	LAT. o ' "	ALT. m	DIAM m	REMARKS
	ANTARCTICA		-90 00 00			

Reason: **RES RAS** sets out the details of the limitation on the radio astronomy service. Annex 1 lists the observatories that operate in the radio astronomy service in bands shared with terrestrial services above 71 GHz at the time of WRC-00.

[8] The Nobeyama site includes a 45 m diameter telescope, an interferometer that consists of 6 antennas of 10 m diameter, and a 60 cm diameter submillimeter telescope.

IAP/14/226
ADD

RESOLUTION XXX (WRC-2000)

Consideration by a Future World Radiocommunication Conference of Issues Dealing with Sharing between Passive and Active Services 71GHz

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that the changes made to the table of allocations by WRC-2000 in bands above 71 GHz were based on the requirements known at the time of the conference;

b) that the passive service spectrum requirements above 71 GHz are based on physical phenomenon and therefore are well known. These requirements are reflected in the changes made to the table of allocations by WRC-2000;

c) that several bands above 71 GHz are already used by EESS (passive) and SR (passive) because they are unique bands to measure specific atmospheric parameters;

d) that currently there is only limited knowledge of requirements and implementation plans for the active services to operate in bands above 71 GHz;

e) that in the past, technological developments have led to viable communication systems operating at increasingly higher frequencies and this can be expected to continue so as to make communication technology available in the future for the frequency bands above 71 GHz;

f) that in the future, there should be accommodation of alternative spectrum needs of the active and passive services when the new technologies become available;

g) that, following the revisions to the table of allocations by WRC-2000, sharing studies may be required for services in some bands above 71 GHz;

h) that interference criteria for passive sensors have been developed and are given in ITU-R SA.1029-1;

j) that sharing criteria for active and passive services in bands above 71 GHz have not yet fully developed within the ITU-R;

k) that in order to ensure the protection of passive services above 71 GHz WRC-2000 avoided co-allocations of active and passive services to prevent potential sharing problems;

recognizing

that to the extent practicable, the burden of sharing among active and passive services should be equitably distributed amongst the allocated services;

invites ITU-R

1) continue its studies to determine if sharing is possible between active and passive services in the bands above 71 GHz;

2) to take into account the principles of burden sharing to the extent practicable in their studies;

3) complete the necessary studies, as soon as the technical characteristics of the active services in these bands are known;

4) develop recommendations specifying sharing criteria for those bands where sharing is feasible.

resolves

that a future competent conference should consider the results of ITU-R studies with a view to revise as appropriate the Radio Regulations in order to accommodate the emerging requirements of the active services taking into account the requirements of the passive services, in bands above 71 GHz;

instructs the Secretary-General

to bring this Resolution to the attention of the international and regional organizations concerned.

IAP/14/227
ADD

RESOLUTION YYY (WRC-2000)

Consideration by a future competent World Radiocommunication Conference of Issues Dealing with Sharing between Active Services above 71 GHz

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that WRC-2000 made changes to the table of allocations above 71 GHz, following consideration of science service issues;

b) that there are several co-primary active services in some bands above 71 GHz in the table of allocations as revised by WRC-2000;

c) that there is limited knowledge of characteristics of active services that may be developed to operate in bands above 71 GHz;

d) that sharing criteria for sharing between active services in bands above 71 GHz have not yet been fully developed within the ITU-R;

e) that sharing between multiple co-primary active services may hinder the development of each active service in bands above 71 GHz;

f) that the technology for some active services may be commercially available earlier than for some other active services;

g) that adequate spectrum should be available for the active services for which the technology is available at a later time;

noting

that sharing criteria need to be developed, to be used by a future Conference, for determining to what extent sharing between multiple co-primary active services is possible in each of the bands;

resolves

1. that appropriate measures should be taken to fulfill the spectrum requirements for active services for which the technology is commercially available at a later time;

2. that sharing criteria be developed for co-primary active services in bands above 71 GHz;

3. that the sharing criteria developed should form a basis for a review of active service allocations above 71 GHz at a future conference, if necessary;

requests ITU-R

to complete the necessary studies with a view to presenting, at the appropriate time, the technical information likely to be required as a basis for the work of a future competent Conference;

instructs the Secretary-General

to bring this Resolution to the attention of the international and regional organizations concerned.

Reason: There is no consensus whether sharing between the passive services and the active services is feasible in many of the bands above 71 GHz. This is because there is a lack of information available on these active services in this frequency range. New Resolution XXX has been added which calls for ITU-R studies on sharing between active and passive services in bands above 71 GHz. Similarly, sharing conditions between many of the relocated active services above 71 GHz are not known and need to be developed and Resolution YYY calls for studies that can develop sharing criteria and should form a basis for a review of active service allocations above 71 GHz at a future conference, if necessary

IAP/14/228

ADD

S4.XXX. Regarding frequency bands above 71 GHz, administrations should consider Resolutions XXX and YYY in the development of domestic policies and regulation which would open specific bands for use by an allocated radio service. Administrations should note the possibility of changes to Article S5 to accommodate emerging requirements of active services, as indicated in Resolutions XXX and YYY.

Reason: Article S4 provides guidance to administrations on the assignments and use of frequencies given in the tables of allocations in Article S5. Additional footnote S4.XXX will draw the attention of administrations to Resolutions XXX and YYY regarding frequency allocations above 71 GHz.

WRC-2000 Agenda Item 1.19

to consider the report of the Inter-conference Representative Group (IRG) submitted by the Director of the Radiocommunication Bureau and determine the basis for replanning by the next Conference so as to afford each country an amount of spectrum that permits the economical development of a broadcasting satellite service system.

Ensuring the protection of other radiocommunication services and Region 2 BSS against interference from any revisions to the Regions 1 and 3 Plan, and not requiring these services to provide greater protection to Regions 1 and 3 BSS than at present.

Submitted by the following Administrations:

[Antigua and Barbuda], [Bahamas], [Barbados], [Belize], [Bolivia], [Brazil], [Chile], [Colombia], [Costa Rica], [Dominica], [Dominican Republic], [Ecuador] [El Salvador], [Grenada], [Guatemala], [Guyana], [Haiti], [Honduras], [Jamaica], [Nicaragua], [Panama], [Paraguay], [Peru], [Saint Lucia], [Saint Vincent and the Grenadines], [St. Kitts and Nevis], [Suriname], [Trinidad and Tobago], [Venezuela]

Argentina, Canada, Mexico, United States, Uruguay

Background Information: WRC-97 up-dated the Regions 1 and 3 BSS and feeder link Plans, including the relevant technical criteria, and provided assignments for all new countries. However, there was general dissatisfaction with the number of channels assigned (5 for Region 1 and 4 for Region 3). The new replanning is intended to provide for each Region 1 and 3 country an amount of spectrum that permits the economical development of BSS systems.

To prepare for this, WRC-97 adopted Resolution 532 which created the IRG (Inter-Conference Representative Group) and the associated GTE (Group of Technical Experts). The same Resolution specified in Annex 1 the principles that will govern the studies of the IRG and GTE. The IRG and GTE studied the feasibility of increasing to around ten the number of 27-MHz channels per country provided in the WRC-97 Plan for Regions 1 and 3. Under Agenda item 1.19 as originally adopted at WRC-97, WRC-99 (now WRC-2000) would then use the results of the IRG/GTE studies to decide whether or not a subsequent WRC should revise the WRC-97 Plan.

However, the 1998 meeting of the ITU Council amended Agenda Item 1.19 to its present form. The goal of "around ten channels" was replaced by "an amount of spectrum that permits the development of an economical BSS system." And the purpose of the IRG/GTE studies was changed from determining the feasibility of the goal, to providing the basis for a subsequent Conference to construct a new Plan. Nonetheless, the IRG/GTE planning studies are still constrained to observe the eight "principles" set forth in Annex 1 to Resolution 532, including those intended to ensure compatibility with other services and to preserve the integrity of the Region 2 Plan.

These guiding principles (see Annex 1 to Resolution 532) include the following:

7. Ensure that the integrity of the Region 2 Plans and their associated provisions is preserved, by providing the same protection to the assignments contained in those Plans as now received under the relevant provisions of the Radio Regulations, and by not requiring more protection from assignments in the Region 2 Plans than that currently provided under the Radio Regulations.
8. Ensure compatibility between the broadcasting-satellite service in Regions 1 and 3 and services having allocations in the planned bands in all three Regions.

At the final IRG meeting a report was prepared on the results of the technical, planning feasibility and regulatory studies. This report will be submitted by the Director, BR, to WRC 2000.

Proposal(s):

IAP/14/ 229
MOD

CITEL supports the objective of increasing the capacity assigned to each country of Region 1 and 3 sufficiently to permit the economic development of BSS systems (to around 10 channels). Any replanning studies, or actual replanning, must protect FSS, terrestrial services and Region 2 BSS in accordance with Principles 7 and 8 of Resolution 532, Annex 1. Further, FSS, terrestrial services and Region 2 BSS must not be required to provide greater protection to the Regions 1 and 3 Plans than at present. This leads to the following:

a) Assignments in the Region 2 BSS Plans (including Article 4 modifications) shall be protected to the level received under the current provisions of the Radio Regulations. Also such assignments shall not be required to provide more protection than is provided under the current provisions.

b) FSS and terrestrial systems, for which appropriate coordination procedures have been initiated, should be protected from revisions to the Regions 1 and 3 Plans to the level received under the current provisions of the Radio Regulations. Also such systems should not be required to provide more protection than is provided under the current provisions.

c) As part of this protection, the preservation of the orbital arc 37WL to 10EL, as delineated in Annex 7 of Appendix S30, and ensuring Region 2 FSS access to it, is essential (see separate IAP on this subject for details).

d) Concerning a) and b), the BR must determine which FSS, terrestrial and Region 2 BSS systems are affected by revisions of the Regions 1 and 3 Plans. For any such assignments in the Regions 1 and 3 Plans, a note in the revised plan should specify that before implementation, the agreement of the affected administration must be secured. Similarly for any Regions 1 and 3 assignment in the revised plan that might be potentially affected by a FSS, terrestrial or Region 2 BSS system, a note should be added to the Regions 1 and 3 Plan assignment specifying that it cannot seek protection from the potentially "affecting" system.

Reason: Any revision of the Regions 1 and 3 Plans, or re-planning studies, must protect other services and Region 2 BSS in accordance with the current criteria of Appendices S30 and S30A, and must not introduce additional constraints upon those services, in accordance with Principles 7 and 8 of Annex 1 to Resolution 532 (WRC-97). Systems that have initiated the coordination procedure should be protected by any revisions of the Regions 1 and 3 Plans. Similarly, in the other direction, systems that have initiated the coordination procedure should not have to protect new assignments in the Regions 1 and 3 Plans. As envisioned by principles 7 and 8 of Resolution 532, these other services that are currently undergoing coordination under the Radio Regulations should not be subject to new, retroactive requirements.

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in accordance with Article S14, to consider objections expressed by administrations with respect to the Radio Regulations Board's Rules of Procedure relating to the application of RR 2674/S23.13 in order for the Bureau to modify its findings in accordance with the conclusions of the Conference

Radio Regulations Board's Rules of Procedure relating to the application of RR 2674/S23.13

Submitted by the following Administrations:

[Antigua and Barbuda], [Argentina], [Bahamas], [Barbados], [Belize], [Chile], [Colombia], [Dominica], [Dominican Republic], [Ecuador] [El Salvador], [Grenada], [Guyana], [Haiti], [Honduras], [Jamaica], [Nicaragua], [Panama], [Paraguay], [Peru], [Saint Lucia], [Saint Vincent and the Grenadines], [St. Kitts and Nevis], [Suriname], [Trinidad and Tobago]

Argentina, Bolivia, Brazil, Canada, Costa Rica, Guatemala, Mexico, Uruguay, United States, Venezuela

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Background Information: No. S23.13 (RR2674) states that, "in devising the characteristics of a space station in the broadcasting-satellite service, all technical means available shall be used to reduce, to the maximum, the radiation over the territory of other countries unless an agreement has been previously reached with such countries." No. S23.13 (RR2674) was adopted at WARC-71. It was intended as a statement of good engineering practice to reduce BSS interference with the terrestrial services outside of the intended service area.

At WRC-95, however, some countries sought to have the interpretation of No. S23.13 (RR 2674) revised to require, as a condition for registration, the approval of other countries within the service area of a BSS system proposed as a plan modification. After thorough debate, WRC-95 instructed the RRB to revise its Rules of Procedures to reflect the results of its debate. The decision reached by WRC-95 reflected a difficult compromise on the parts of all parties involved. The RRB made the revisions, but further concerns were raised at WRC-97. These concerns led WRC-97 to adopt Resolution 536 which resolves that: "in addition to observing No. S23.13/2674, and before providing satellite broadcasting services to other administrations, administrations originating the services should obtain the agreement of those other administrations."

Still dissatisfied after a review of the RRB Rules for RR S23.13 under the "review of finding" procedures of Article S14, the concerned countries persuaded the 1998 meeting of the ITU Council to adopt new agenda item 1.19bis.

Proposal(s):

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Therefore, CITEL is of the view that there is no need to repeat the work and discussion of WRC-95 and WRC-97, and that Resolution 536 and RR S23.13 are sufficient. CITEL proposes that WRC-2000 not revise the present Rule of Procedure for RR S23.13/2674 to apply it retroactively, i.e., to BSS filings (under Article 4 of Appendix S30 or under Resolution 33 or under Article S9) made prior to 18 November 1995. CITEL also supports the existing separation of Article 4 of Appendix S30 and the Rule of Procedure for RR S23.13/2674.

Reason: Agenda Item 1.19*bis* has the effect of re-opening an issue that was resolved after much discussion first at WRC-95, and then at WRC-97 by the adoption of Resolution 536.

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to consider the issues related to the application of Nos. S9.8, S9.9 and S9.17 and the corresponding parts of Appendix S5 with respect to Appendices S30 and S30A, with a view to possible deletion of Articles 6 and 7 of Appendices S30 and S30A, also taking into consideration Recommendation 35 (WRC-95);

PFD limits in Annex 1 to Appendix S30 (Sections 5b and 5c)

Submitted by the following Administrations:

[Antigua and Barbuda], [], [Bahamas], [Barbados], [Belize], [Bolivia], [Chile], [Colombia], [Costa Rica], [Dominica], [Dominican Republic], [Ecuador], [Grenada], [Guatemala], [Guyana], [Haiti], [Honduras], [Jamaica], [Nicaragua], [Panama], [Paraguay], [Peru], [Saint Lucia], [Saint Vincent and the Grenadines], [St. Kitts and Nevis], [Suriname], [Trinidad and Tobago], [Venezuela]

Argentina, Brazil, Canada, El Salvador, Mexico, United States, Uruguay

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Background Information: Annex 1 to Appendix **S30** of the Radio Regulations specifies limits for determining whether a service is affected by a proposed modification to the BSS Plan (i.e., when it is necessary to seek the agreement of any other administration). Section 5 of Annex 1 specifies limits to the change in the PFD to protect the terrestrial services of administrations in Regions 1 and 3 from modifications to the Region 2 Plan. In particular, Section 5c specifies the PFD limits for administrations in Region 1 east of longitude 30°E. Further, through Section 8a), the pfd limits in Section 5b) of Annex 1 apply to protect terrestrial services in Regions 1 and 3 from modifications to the Regions 1 and 3 BSS Plan.

This PFD limit is very stringent at low angles of elevation. For example, in order to meet this PFD limit the BSS spacecraft power must be significantly lower in remote areas of a Region as compared to other areas in the center of the Region. As a result, the provision of BSS service to these areas requires larger BSS receive dishes, in some cases as large as 2.4 m.

A relaxation in the PFD limit in Section 5c of Annex 1 of Appendix **S30**, as proposed below, would allow the use of 60 cm BSS receive dishes in these areas for BSS service. The ITU-R studied possible modifications to the limits in Sections 5b) and 5c) of Annex 1. Section 5.2.3.5 of the CPM Report contains a proposed change to these limits. Consistent with the CPM Report, the following changes to Section 5 of Annex 1 of Appendix S30 are proposed. As a result of these modifications to Sections 5b) and 5c), Table 3 of Article 10 of Appendix S30 should be reviewed and revised appropriately.

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APPENDIX **S30**

* * *

ANNEX 1

* * *

5 Limits to the change in the power flux-density to protect the terrestrial services of administrations in Regions 1 and 3[16]

With respect to § 4.3.3.4 of Article 4, an administration in Region 1 or 3 shall be considered as being affected if the proposed modification to the Region 2 Plan would result in the following power flux-density limits being exceeded:

a) in the frequency band 12.2-12.7 GHz for all the territories of administrations in Regions 1[17] and 3 and for any arrival angle γ :

– 125 dB(W/m^2/4 kHz)	for broadcasting-satellite space stations using circular polarization;
– 128 dB(W/m^2/4 kHz)	for broadcasting-satellite space stations using linear polarization;

b) in the frequency band 12.2-12.~~5~~7 GHz for territories of administrations in Regions 1[17] and 3 ~~and those in the western part of Region 1, west of longitude 30° E~~[18]:

– 148~~132~~ dB(W/m^2/~~5 M~~4 kHz) for $0° \le \gamma <$ ~~10~~5°;

– ~~132~~ 148 + 0.5~~4.2~~ (γ – ~~10~~5) dB(W/m^2/~~5 M~~4 kHz) for ~~10~~5° $\le \gamma <$ ~~15~~25°;

– 138~~111~~ dB(W/m^2/~~5 M~~4 kHz) for ~~15~~25° $\le \gamma <$ 90°;

~~*c)* in the frequency band 12.2-12.7 GHz for territories of administrations in Region 1[17], east of longitude 30° E:~~

~~– 134 dB(W/m^2/5 MHz) for $\gamma = 0°$;~~

~~– 134 + 4.6975 γ^2 dB(W/m^2/5 MHz) for $0° < \gamma \le 0.8°$;~~

~~– 128.5 + 25 log γ dB(W/m^2/5 MHz) for $\gamma > 0.8°$;~~

~~*d*~~*c)* in the frequency band 12.5-12.7 GHz for all the territories of administrations of Regions 1[17] and 3:

– 148 dB(W/m^2/4 kHz) for $\gamma = 0°$;

– 148 + 4.6975 γ^2 dB(W/m^2/4 kHz) for $0° < \gamma \le 0.8°$;

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16 See § 3.18 of Annex 5.

17 In the band 12.5-12.7 GHz in Region 1, these limits are applicable only to the territory of administrations mentioned in Nos. **S5.494** and **S5.496**.

18 See Resolution **34**.

$-142.5 + 25 \log \gamma$ dB(W/m^2/4 kHz) for $\gamma > 0.8°$;

where γ is the angle of arrival of the incident wave above the horizontal plane, in degrees.

Reason: The proposed modification to the PFD limit in Section 5c of Annex 1 of Appendix S30 would allow the use of much smaller BSS receive earth station antennas, for instance, on the order 60 cm diameter, in these areas for BSS service. This proposal is consistent with the CPM Report.

WRC-2000 Agenda Item 2

to examine the revised ITU-R Recommendations incorporated by reference in the Radio Regulations in accordance with Resolution 28 (WRC-95); and decide whether or not to update the corresponding references in the Radio Regulations, in accordance with principles contained in the Annex to Resolution 27 (Rev.WRC-97)

Proposals to modify Resolution 27 (Rev.WRC-97) and Resolution 28 (WRC-95)

Submitted by the following Administrations:

[Antigua and Barbuda], [Bahamas], [Barbados], [Belize], [Chile], [Costa Rica], [Dominica], [Dominican Republic], [El Salvador], [Grenada], [Guatemala], [Guyana], [Haiti], [Honduras], [Jamaica], [Mexico], [Nicaragua], [Panama], [Paraguay], [Peru], [Saint Lucia], [Saint Vincent and the Grenadines], [St. Kitts and Nevis], [Suriname], [Trinidad and Tobago], [Venezuela]

Argentina, Bolivia, Brazil, Canada, Colombia, Ecuador, United States, Uruguay

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Background Information: Certain provisions of the Radio Regulations make specific reference to ITU-R Recommendations. As the ITU-R Recommendations are updated, it is necessary to determine if such references should be continued, suppressed, or updated citing the revised version of the applicable ITU-R Recommendation.

Although the principle of Incorporation by Reference is widely supported by ITU members, its implementation in practice leads to various difficulties. It is important that administrations are aware of which recommendations could be candidates for incorporation by reference into the Radio Regulations. Also, administrations need to know of any ITU-R Recommendation currently incorporated by reference, which are being (or have been) revised during the current study period. Administrations would benefit greatly by being advised of such recommendations well in advance of a WRC. Therefore, a mechanism for the early identification should be established.

In order to allow administrations as much time as possible to consult their experts and to consider the implications of updating references in the Radio Regulations, to reflect changes to Recommendations which are currently incorporated by reference, the approach outlined in 1) below is proposed. Similarly, to facilitate the work of administrations in their preparation for the possible introduction of new instances where Recommendations may be incorporated by reference into the Radio Regulations, the approach outlined in 2) below is proposed.

1) Rather than have only the Radiocommunication Assembly (RA) communicate to the WRC a list of the ITU-R Recommendations currently incorporated by reference in the Radio Regulations which have been revised and approved during the elapsed study period, the Director of the Radiocommunication Bureau should provide a report to the Conference Preparatory Meeting. This report would also include a listing of those ITU-R Recommendations currently incorporated by reference which are being revised in preparation for the RA. This report would be for information only and would not confer any special status on the Recommendations listed.

2) If a Recommendation is not currently incorporated by reference into the Radio Regulations, it could only be considered for incorporation by reference if it is in response to a WRC agenda item.

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RESOLUTION **27** (Rev.WRC-~~97~~2000)

References to ITU-R and ITU-T Recommendations in the Radio Regulations

The World Radiocommunication Conference (~~Geneva, 1997~~ Istanbul, 2000),

considering

a) that the principles of incorporation by reference were adopted by the WRC-95 and have been revised by this Conference (see Annex 1 to this Resolution);

b) that there are provisions of the Radio Regulations which employ mandatory incorporation by reference but fail to make explicit reference to the ITU-R or ITU-T Recommendations incorporated;

c) that the 199~~7~~9Conference Preparatory Meeting (CPM-~~97~~99) for this Conference urged administrations to give further consideration to the status of material incorporated by reference:

– using the initial assessment provided by the Radiocommunication Bureau in the CPM Report and the set of principles given in Annex 1 to this Resolution;

– noting that mandatory references shall be explicit and use the appropriate regulatory language;

– taking into account the factors set out in Annex 2 to this Resolution;

d) that the Director of the Radiocommunication Bureau has drawn up a list (see Annex 1 to the CPM Report to this Conference) of the provisions of the Radio Regulations using incorporation by reference, which provides an initial assessment of the status of each reference and forms the basis for the work on appropriate referencing, examples of which are contained in Annex 3 to this Resolution;

e) that the Bureau has drawn up a list, contained in Annex 4 to this Resolution, of the ITU-R Recommendations to which explicit reference is made in the Radio Regulations,

resolves

that ITU-R and ITU-T Recommendations incorporated or proposed for incorporation by reference in the provisions of the Radio Regulations be identified and examined at WRC-~~99~~[2003], with a view to establishing the correct method of reference in accordance with the principles set out in Annex 1 to this Resolution and taking into account the factors listed in Annex 2 to this Resolution, in order to complete the simplification of the Radio Regulations in respect of incorporation by reference,

further resolves

that, in the case of ITU-R Recommendations which are not currently referenced in the Radio Regulations, only those Recommendations which are in response to a WRC agenda item can be considered for incorporation by reference,

instructs the Director of the Radiocommunication Bureau

to arrange for a review of the provisions of the Radio Regulations containing references to ITU-R or ITU-T Recommendations and propose suitable recommendations to the CPM-~~99~~[2002] for inclusion in its Report to WRC-~~99~~[2003], using the list of provisions contained in Annex 3 to this Resolution together with the guidance contained in Annexes 1 and 2 to this Resolution, and taking into account the list of ITU-R Recommendations contained in Annex 4 to this Resolution,

urges administrations

to use the CPM Report to WRC-~~99~~[2003] in order to prepare their proposals on incorporation by reference to that Conference.

ANNEX 1 TO RESOLUTION 27 (Rev.WRC-~~97~~2000)

Principles of incorporation by reference

1 Where references are non-mandatory, it is not necessary to establish specific conditions in applying the texts quoted. In such cases, reference could, for example, be made to "the latest version" of a Recommendation.

2 Mandatory references to Resolutions or Recommendations of a world radiocommunication conference (WRC) are acceptable without restriction, since such texts will have been agreed by a WRC.

3 Where mandatory references are suggested, and the relevant texts are brief, the referenced material should be incorporated in the body of the Radio Regulations.

4 If, on a case-by-case basis, it is decided to incorporate material by reference on a mandatory basis, then the following provisions shall apply:

4.1 the referenced text shall have the same treaty status as the Radio Regulations themselves;

4.2 the reference must be explicit, specifying the specific part of the text (if appropriate) and the version or issue number;

4.3 the referenced text must be adopted by the Plenary of a competent WRC, but should not be part of the Final Acts;

4.4 all texts incorporated by reference must be readily available, by being published in a separate volume;

4.5 if, between WRCs, a referenced text (e.g. an ITU-R Recommendation) is updated, the reference in the Radio Regulations shall continue to apply to the original version until such time as a competent WRC agrees to incorporate the new version of the reference. The mechanism for considering such a step is given in Resolution **28 (Rev. WRC-~~95~~2000)**.

ANNEX 2 TO RESOLUTION 27 (Rev.WRC-~~97~~2000)

Factors to be considered for the further application of incorporation by reference

In reviewing the provisions of the Radio Regulations employing references to other texts, administrations and study groups should address the following factors:

1 whether each reference is of mandatory~~, i.e. incorporated by reference,~~ or non-mandatory character;

2 whether in existing non-mandatory references, or mandatory references which are determined to be of non-mandatory character, appropriate linking language is used, e.g. the words “should” or “may”;

3 whether in existing mandatory references, or other types of reference which are determined to be of mandatory character, clear mandatory linking language is used, e.g. the word “shall”;

4 whether the incorporated ITU-R or ITU-T Recommendation(s) are explicitly identified;

5 where referenced ITU-R or ITU-T Recommendations are not explicitly identified, determine which ones should be identified;

6 whether text incorporated from ITU-R or ITU-T Recommendations should be placed directly in the Radio Regulations instead of using incorporation by reference;

7 if the ITU-R or ITU-T Recommendation to be incorporated is, as a whole, unsuitable as treaty status text, whether to limit the reference to those portions of the ITU-R or ITU-T Recommendation which are of a suitable nature or to place the mandatory portion directly in the Radio Regulations.

Reason: To clarify that, in the case of ITU-R Recommendations which are not currently referenced in the Radio Regulations, only those Recommendations which are in response to a WRC agenda item can be considered for incorporation by reference. Also, minor consequential editorial changes have also been identified.

IAP/14/233
MOD

RESOLUTION 28 (Rev.WRC-~~95~~2000)

Revision of references to ITU-R Recommendations incorporated by reference in the Radio Regulations

The World Radiocommunication Conference (~~Geneva, 1995~~ Istanbul, 2000),

considering

a) that the Voluntary Group of Experts on simplification of the Radio Regulations (VGE) proposed the transfer of certain texts of the Radio Regulations to other documents, especially to ITU-R Recommendations, using the incorporation by reference procedure;

b) that, in some cases, the provisions of the Radio Regulations imply an obligation on Member States to conform to the criteria or specifications incorporated by reference;

c) that references to incorporated texts shall be explicit and shall refer to a precisely identified provision;

d) that, taking into account the rapid evolution of technology, ITU-R may revise the Recommendations incorporated by reference at short intervals;

e) that revised and approved Recommendations will not have the same legal force as the initial Recommendations incorporated by reference until a competent world radiocommunication conference has so decided;

f) that it would be desirable to ensure, in the cases provided for in the Radio Regulations, that the provisions reflect the most recent technical developments,

noting

that Member States would benefit greatly from being advised, as early as possible, of which Recommendations have been revised and approved during the study period,

resolves

1 that each Radiocommunication Assembly shall communicate to the following world radiocommunication conference a list of the ITU-R Recommendations incorporated by reference in the Radio Regulations which have been revised and approved during the elapsed study period;

2 that, on this basis, the WRC shall examine those revised Recommendations, and decide whether or not to update the corresponding references in the Radio Regulations;

3 that, if the WRC decides not to update the corresponding references, ITU-R shall continue publishing the ITU-R Recommendations currently referenced in the Radio Regulations;

4 that WRCs shall place the examination of Recommendations in conformity with *resolves* 1 and *resolves* 2 of this Resolution on the agenda of future WRCs,

further resolves

1 to instruct the Director of the Radiocommunication Bureau to report to the CPM immediately preceding the WRC those ITU-R Recommendations already incorporated by reference in the Radio Regulations which have been revised and approved since the previous WRC, or which may be revised in time for the Radiocommunication Assembly;

2 that, in the case of ITU-R Recommendations which are not currently referenced in the Radio Regulations, only those Recommendations which are in response to a WRC agenda item can be considered for incorporation by reference,

urges administrations

to participate actively in the work of the Radiocommunication Study Groups and the Radiocommunication Assembly in the revision of those Recommendations to which mandatory references are made in the Radio Regulations.

Reason: To establish a procedure to advise Administrations, well in advance of a WRC, of those ITU-R Recommendations already incorporated by reference in the Radio Regulations which have been revised and approved since the previous WRC, or which may be revised in time for the Radiocommunication Assembly. Also to clarify that, in the case of ITU-R Recommendations which are not currently referenced in the Radio Regulations, only those Recommendations which are in response to a WRC agenda item can be considered for incorporation by reference. Minor consequential editorial changes have also been identified.

in accordance with Resolution **95**, to review the Resolutions and Recommendations of previous conferences with a view to their possible revision, replacement or abrogation;

Suppression of Resolution 63

Submitted by the following Administrations:

[Antigua and Barbuda], [Bahamas], [Barbados], [Belize], [Brazil], [Colombia], [Chile], [Costa Rica], [Dominica], [Dominican Republic], [Grenada], [Guatemala], [Guyana], [Haiti], [Honduras], [Jamaica], [Mexico], [Nicaragua], [Panama], [Paraguay], [Peru], [Saint Lucia], [Saint Vincent and the Grenadines], [St. Kitts and Nevis], [Suriname], [Trinidad and Tobago], [Venezuela]

Argentina, Bolivia, Canada, Ecuador, El Salvador, United States, Uruguay

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Background Information: A proposal for the suppression of Resolution 63, this resolution is being suppressed because the work of TG1/2 related to this resolution has been completed.

Proposal(s):

IAP/14/234

SUP

~~**RESOLUTION 63**~~

~~**Relating to the protection of radiocommunication services against interference caused by radiation from industrial, scientific and medical (ISM) equipment**~~

Reason: TG1/2 completed its work related to Resolution **63**.

Application of RR No. S5.488

A procedural matter related to clarification of provision No. **S5.488** (formerly No. **839**) was brought to the attention of the CPM.

Footnote S5.488

Submitted by the Administrations below:

[Antigua and Barbuda], [Argentina], [Bahamas], [Barbados], [Belize], [Bolivia], [Canada], [Chile], [Costa Rica], [Dominica], [Grenada], [Guyana], [Haiti], [Honduras], [Jamaica], [Mexico], [Nicaragua], [Panama], [Paraguay], [Dominican Republic], [Saint Lucia], [Saint Vincent and the Grenadines], [Saint Kitts and Nevis], [Suriname], [Trinidad and Tobago], [United States]

Colombia, Ecuador, El Salvador, Guatemala, Peru, Uruguay, Venezuela

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Background Information: A procedural matter related to clarification of provision No. **S5.488** (formerly No. **839**) was brought to the attention of the CPM.

Former Radio Regulations provision RR **839** included the requirement for agreement under Article 14 for FSS in the frequency band 11.7-12.2 GHz in Region 2. This provision was modified by WRC-95 to become **S5.488**. WRC-97 did not introduce any change to that provision.

The RRB revised the Rules of Procedure relating to **S5.488** at its 13th meeting 6-14 July, Geneva, 1998 which became effective as from 1 January 1999. This revision was based on the understanding that the new wording of **S5.488**, with no explicit reference to **S9.21**, means that there is no longer a need for the specific procedures of **S9.21** to be applied to FSS networks in the band 11.7-12.2 GHz in Region 2. The use of the frequency band 11.7-12.2 GHz, for FSS GSO in Region 2, was subject to the application of Article 14 until 1 January 1999.

Since there are now no hard pfd limits applicable to geostationary FSS in this band, the revised Rule removes the only regulatory mechanism available to terrestrial services for their protection from GSO FSS service. It is worth mentioning that terrestrial services are protected from non-GSO FSS systems through provisional pfd levels contained in Resolution **131 (WRC-97)**, and in **S21.16**. All other intra- and inter-service relations in this band are not affected by the modified Rule since, for them, there are other regulatory mechanisms that apply.

In order to bridge the apparent regulatory gap, there is a need to establish an appropriate regulatory mechanism by which the terrestrial service sharing the same frequency band with the space service, on an equal basis, are to be adequately protected.

Considering that there is a need to ensure protection of the fixed service operating in the band 11.7-12.2 GHz, and that the simplest and safest way for this purpose is to adopt Approach 1, as described in Section 7.6.3.1 of the CPM report administrations propose to introduce in Article **S21** hard pfd limits for geostationary fixed-satellite networks of Region 2 similar to those currently in Article **S21** (**S21.16**) for non-GSO FSS systems operating in this frequency band. A consequential change of **S5.488** is also proposed.

Proposal(s):

IAP/14/235

MOD

S5.488 The use of the bands 11.7-12.2 GHz by geostationary-satellite networks in the fixed-satellite service in Region 2 and 12.2-12.7 GHz by the broadcasting-satellite service in Region 2 is limited to national and subregional systems. ~~The use of the band 11.7-12.2 GHz by the fixed-satellite service in Region 2 is subject to previous agreement between administrations concerned and those having services, operating or planned to operate in accordance with the Table, which may be affected (see Articles **S9** and **S11**).~~ For the use of the band 12.2-12.7 GHz by the broadcasting-satellite service in Region 2, see Appendix **S30**.

Reason: The hard limits proposed for inclusion in Article **S21** ensure full protection of terrestrial services, hence there is no need for specific additional provisions.

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MOD

TABLE **S21-4** *(continued)*

Frequency band	**Service***	**Limit in dB(W/m^2) for angle of arrival (δ) above the horizontal plane**			**Reference bandwidth**
		0°-5°	**5°-25°**	**25°-90°**	
10.7-11.7 GHz	Fixed-satellite (space-to-Earth)	–150 14	–150 + 0.5(δ – 5) 14	–140 14	4 kHz
11.7-12.2 GHz (Region 2)	Fixed-satellite (space-to-Earth), geostationary-satellite orbit	–148	–148 + 0.5(δ – 5)	–138	4 kHz
11.7-12.5 GHz (Region 1) 11.7-12.2 GHz (Region 2) 11.7-12.2 GHz (Region 3) 12.2-12.7 GHz (Region 2)	Fixed-satellite (space-to-Earth), non-geostationary-satellite orbit	–148 15	–148 + 0.5(δ – 5) 15	–138 15	4 kHz